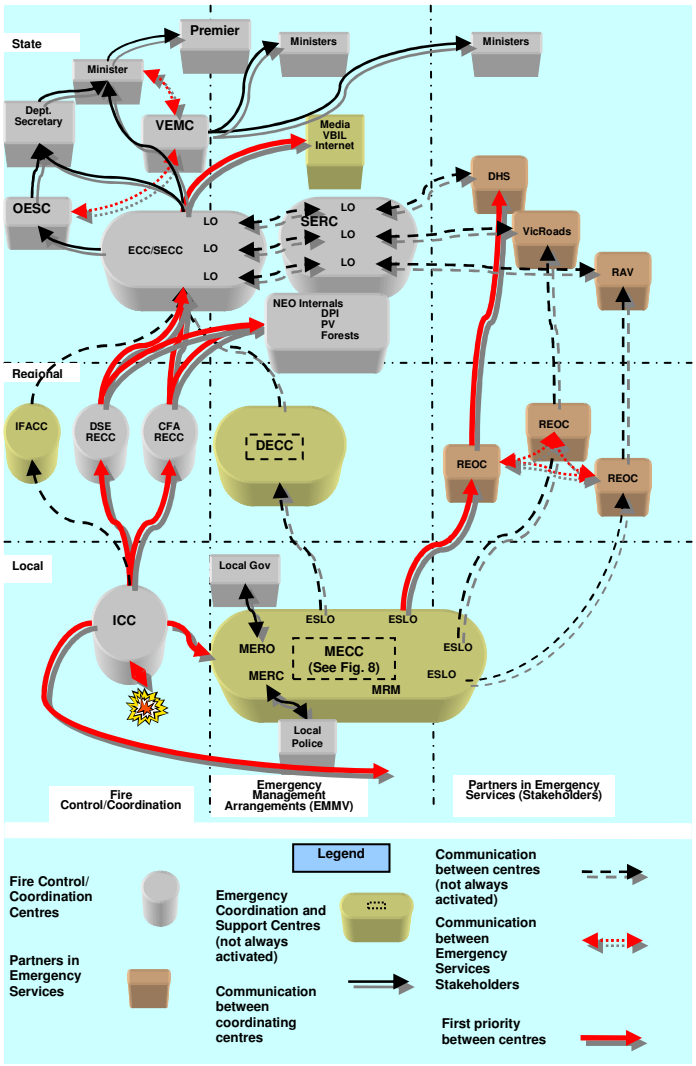
Mapping information flow during critical incidents

1st June 2008



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CONTENTS

TABLES

FIGURES

Acronyms

AAR:	After action review
ABC:	Australian Broadcasting Corporation
AFAC:	Australasian Fire Authorities Council
AIIMS:	Australasian Inter-service Incident Management System
CFA:	Country Fire Authority
DECC:	Divisional Emergency Coordination Centre
DERC:	Divisional Emergency Resource Coordinator
DHS:	Department of Human Services
DIC:	Deputy Incident Controller
DOTARS:	Department of Transport and Regional Services
DPI:	Department of Primary Industries
DSE:	Department of Sustainability and Environment
ECC:	Emergency Coordination Centre
EMMV:	Emergency Management Manual Victoria
ESLO:	Emergency Services Liaison Officer
ICC:	Incident Control Centre
ICS:	Incident control system
IFACC:	Integrated Fire Agency Coordination Centre
IIP:	Incident information plan
IMT:	Incident management team
IU:	Information Unit
MECC:	Municipal Emergency Coordination Centre
MERC:	Municipal Emergency Resource Coordinator
MERO:	Municipal Emergency Response Officer

MFESB:	Metropolitan Fire and Emergency Services Board
MOU:	Memorandum of understanding
NDMP:	National Disaster Mitigation Program
NEMMCO:	National Electricity Market Management Company
NEO:	Networked Emergency Organisation
OESC:	Office of Emergency Services Commissioner
PV:	Parks Victoria
RECC:	Regional Emergency Coordination Centre
REOC:	Regional Emergency Operations Centre
SDO:	State Duty Officer
SERC:	State Emergency Resource Coordinator
SES:	State Emergency Services
SEWS:	State Emergency Warning Signal
SMS:	Short message service
VBIL:	Victorian Bushfire Information Line
VEMC:	Victoria Emergency Management Council
VENcorp:	Victorian Energy Networks Corporation
VF:	VicForests

Document history

Document amendments

Version	Date	Summary of Changes	Author
	30/07/07	Review of documentation	Christine Owen
V1.1	23/08/07	Working draft only – for internal consultation	Christine Owen
V1.2	28/09/07	Updated documentation – for consultation	Christine Owen, Greg Hickey & Jan Douglas
V1.3	15/12/07	Revised draft – inclusion of new research data	Christine Owen, Greg Hickey & Jan Douglas
V1.4	31/01/08	Revised draft – includes DSE feedback	Christine Owen, Greg Hickey & Jan Douglas
V1.5	20/03/08	Revised draft includes internal and external partner feedback	Christine Owen, Greg Hickey & Jan Douglas

Attachments

	Name	Version	Date
1	Summary of International literature review		DSE Plan to improve 2005-2009
2	Extracts from Plan to improve integrated and coordinated communication	V 1	23/08/07
3	Summary of participants involved in interviews		2001-2005
4	Relevant recommendations from previous reports investigating information flow in emergency incident management		DSE Plan to improve 2005; Schauble, 2006
5	Extract from Australasian Fire Authorities Council Position on bushfires and Community Safety	n/a	
6	Extracts from the Australasian Inter-service Incident Management System manual outlining the Incident Controller's roles and responsibilities in information flow to the community	V 3	AFAC 2005
7	Extracts from the Code of Practice for fire Management on Public Land		2006
8	Analysis of Review of DSE feedback from personnel involved in the 2006/07 fires		2007
9	Community Information Mapping Flow Interview Questions (Phase 1) Emergency management partners Information Mapping Flow Questions (Phase 2)		2007

10	Interview transcripts excerpts		2007
11	AIIMS Framework for managing fire-related emergency events		AIIMS manual 2005
12	Organisational chart of Information Unit in Levels 1-3 incidents		Guidelines for the AIIMS Information Unit 2007
13	Emergency management partners' information needs summary		2007
14	Emergency management partners' levels of satisfaction summary		2007
15	Community information needs during fire events		2007

Related documents

Name	Date
Emergency Management Manual Victoria, Parts 1, 3, 4, 5, 7, 8	Pt1: 01/05; Pt3: 07/03 Pt4: 03/05; Pt5: 01/06 Pt7: 05/07; Pt8: various
Community Engagement about fire on public land. Plan to improve 2005-2009	Dec 2005
Department of Sustainability and Environment , Code of Practice for Fire Management on Public Land	Feb 2006
Issue Paper on: The Provision of fire Information and Intelligence, Fire and Emergency Management Division, Department of Sustainability and Environment	July 2006
Schauble, J. Joint CFA/DSE review of effectiveness of information flow to communities and media during fire incidents	July 2006
Initiative: Public Land Fire Initiative – Operational Procedures Project	August 2006
Information Unit Workbook 2006/07	August 2006
Dept of Primary Industries, Emergency management framework	October 2006
State Emergency Recovery Planning Committee, Framework for transition from response to recovery	Dec 2006
Smith, R Key Issues Identified from Operational Reviews of Major fires in Victoria 2006/07	July 2007
Guidelines for the AIIMS Information Unit, Version 3.1	Sept 2007

Executive summary

The objectives of the research, enabled through funding support from the Natural Disaster Mitigation Program (NDMP) of the Department of Transport and Regional Services (DOTARS) and with support from the Bushfire Co-operative Research Centre were to:

- map the flow of information during fire-related emergency events to emergency management partners and the community;
- identify key areas for improvement in information flows to emergency management partners;
- develop a prioritisation framework for critical information to emergency management partners during critical incidents.

Background

A number of internal and external reviews and inquiries have identified the need for improvements to information flow, particularly to communities and other partner agencies that are affected or play an emergency services role. A review of documentation reveals considerable effort to improve information flow within various parts of the organisation and Incident Management System. However, senior fire and land personnel in the Department of Sustainability and Environment (DSE) believed that more improvement could be made and thus commissioned this report to review how, in fire-related events, information flow between control agencies and other emergency management partner organisations might continue to be enhanced.

Research methods

Data collection methods employed in the conduct of the research included: a review of previous inquiries into fire-related events in Victoria; a review of the international literature on large-scale multi-agency emergency events; interviews with 40 internal and external stakeholders with roles and responsibilities in fire-related emergency events, all of whom had had direct involvement in the 2006/07 fire season; development of a template of information needs of emergency partners; consultation and re-interviewing of DSE-identified critical partners in fire-related emergency events for feedback and confirmation of extracted information needs; development of information flow mapping for four specific scenarios of required information flow between partners; consultation for feedback and confirmation of scenarios.

Overview of findings

The report:

- reviews what can be learned from inquiries into large-scale multi-agency coordination found in the international literature;
- reviews existing documentation to identify the roles and responsibilities for provision of information to emergency management partners;
- synthesises consultations with emergency management partners about their information needs and their satisfaction with the information they receive;
- maps information flow within and between emergency management partners' agencies in a fire-related event;
- discusses strategies that might enable improvements in information flow.

Reviews of major domestic and international incidents reveal that breakdowns of information flow typically occur at the boundaries of differing agencies or groups. The consequences of

these breakdowns increase in severity with increasing dependency and interdependency between agencies/interests. In the case of critical infrastructure, for example, breakdowns in information flow can lead to consequences as serious as, and potentially longer-lasting, than the incident itself.

Roles and responsibilities

A review of the Emergency Management Manual Victoria (EMMV) shows that, in Victoria, **when fire occurs on public land and in the country, the DSE and the Country Fire Authority are the control agencies**. If such a fire-related emergency event escalates, stakeholders and communities with an interest in the event increase in both number and complexity.

These stakeholders have different information needs, and frequently have information critical to the control agencies. These stakeholders include:

- Those directly involved in control of the event (e.g., fire-fighters on the fire-ground; regional and state centres of emergency coordination);
- Other agencies (internal and external) with direct support to operational activities (e.g., Parks Victoria, VicForests);
- Other agencies with inter-dependent emergency management roles (e.g., Department of Human Services, State Emergencies Services, municipalities);
- Critical infrastructure (e.g., Melbourne Water, Vic Roads, Victorian Energy Networks Corporation, Telstra);
- Other levels of government and private businesses (e.g., Tourism);
- Political sphere (e.g., Office of Emergency Services Commissioner, Victoria Emergency Management Council, government and relevant ministers, Members of Parliament with responsibility in area/portfolio);
- Community members (e.g., general public directly and indirectly affected by the fire).

As part of its initiative to improve information flow, the DSE recognises the need to proactively reconceptualise stakeholder involvement in fire-related emergency management to one of enhancing emergency management partnership arrangements. **Emergency management partner organisations are those agencies with key roles to play, either in providing support to the control agencies or in the provision of services to communities for which those emergency partner agencies are responsible**.

The research conducted here reveals that there is a need for a more systemic approach to developing emergency management partnership arrangements.

The interviews revealed that personnel involved in a fire-related emergency event had a good knowledge of their own role and the immediate context of their own responsibility within the emergency management framework and of the information needs of those with whom they directly inter-related. However, when asked in the interviews to map and describe information flow, respondents indicated a limited understanding of the need and purpose of information flow two steps beyond their own position. Beyond those directly connected to the work activity of the personnel involved, there was also a limited understanding of why other stakeholders might need key information and what they might need to do with that information.

It is reasonable to expect that personnel involved in a fire-related emergency event would not have (or need) a detailed understanding of the activity of all others involved in the emergency management arrangements. Nevertheless, given the increasing need for interoperability between agencies, the need to provide good coordination and service between agencies in times of emergency, and the need to manage many different community and political agendas, there is an increasing requirement for all actors involved in an event to have at least some

understanding of the broader emergency management frameworks within which they play a role. It is important that they have some understanding of the connection between their roles and responsibilities and the critical implications of what they know or need to know for the work of others.

Difficulties of information flow are likely to be exacerbated when the municipal coordination points have not "scaled up" in time. On the control agency side, even though there are protocols for scaling up from the fire-ground to an incident management team and for activating the state level of emergency coordination, how the regional level is activated is still vague. There is also a need for clearer guidelines about what triggers control agencies can reasonably expect will lead to the scale-up of both Municipal Emergency Coordination Centre (MECC) and Divisional Emergency Coordination Centre (DECC) levels of coordination.

While multiple coordination points are inevitable in any complex system, each of these coordination points represents a boundary where the opportunity exists for failure in information flow between groups. When a fire is escalating and the coordination points are also in need of activation or scaling up, potentials for disconnects in information flow are amplified.

Emergency partner information needs

The consultation with emergency management partners identified a broad range of information needs. It should be noted that the themes identified here were ones raised in the interviews by respondents when they discussed the information they needed; respondents were not asked who they thought should provide that information. Responses were grouped around five themes:

- Information pertaining to the dynamic changes occurring to manage the event as well as information about the event itself (e.g., the emergency management arrangements in place, the plans in use, the assets at risk, predictions of the fire and its behaviour);
- Information pertaining to the control agency's operational needs (e.g., personnel involved, catering requirements);
- Community information needs (details included in the incident information plan such as meetings planned, distribution deadlines for newsletters);
- Community needs (demographic profile; emergency relief centres; recovery centres; requirements for habitation; road closures; warnings; alternative arrangements in, for example, school transportation system);
- Health-related information needs (e.g., smoke concentration, plume modelling, livestock losses).

Responses received from representatives from emergency partner organisations have indicated that all agencies want information on how the control agencies are managing the event. In terms of the operational needs of the fire-combat agency, all partners responding to date wanted to know about road closures and road access. Many partners also wanted to have information on how control agencies were providing communities with needed information. Community information needs and health-related needs were more specific and localised (e.g., of interest to municipalities and DHS respectively).

As part of the consultation, emergency management partners were also asked to comment on their levels of satisfaction regarding:

- whether their information needs are currently being met;
- the modality currently used to disseminate information;
- the timeliness of information received; and
- the relevance of information received.

From the perspective of information provided from the DSE, recent improvements in the way were noted and there is general satisfaction with the information provided. There are however, some areas identified that are still in need of improvement. Dissatisfaction with the timeliness of the information received continues to be problematic and appears to be an issue for most of the internal and external partners consulted. This raises issues of information flow both within the Incident Management Team and between the various layers of regional and state coordination within the agency responsible for control of the fire(s).

Mapping information flow

The report maps the different areas of responsibility and different information flow patterns needed between:

1. levels in the control structure;
2. the fire control structure and the municipal and other arrangements articulated in the EMMV; and
3. emergency management partner organisations.

The report also maps the information flow arrangements needed in four different scenarios: Information flow needed to:

1. activate a road closure (traffic management point);
2. manage a threat to electrical power infrastructure;
3. relocate a human service facility; and
4. manage access to emergency relief for a family of self-evacuees.

The maps identify where information flow for the particular scenario is critical and what flows need to be prioritised.

Information needs to communities are also discussed. Different geographic communities can be identified in terms of their relationship to the proximity of the fire.

Strategies to improve information flow

From the research reported and discussed, 33 strategies are identified to improve information flow between agencies responsible for controlling fire-related emergency events and emergency management partner organisations. They include:

- utilising a range of information communications technologies (Pod-casting; developing shared databases);
- engaging in training (for control agency personnel; inter-agency training exercises; leadership development)
- reviewing roles and responsibilities (within the information unit; in liaison with other points of coordination; relationships between information management teams (IMT) and Integrated Fire Agency Coordination Centres (IFACC) when activated)
- enhancing agency inter-operability and planning
- reviewing protocols for scale-up of regional control levels (IFACC) as well as municipal coordination and support (DECC)
- addressing partner organisation information needs (templates, protocols for activation and authorisation)
- further investigation into fire-ground/IMT information flow and into partner agency information needs

1 Introduction

The Department of Sustainability and Environment (DSE) is committed to building partnerships to develop 'more resilient relationships between communities, stakeholders and partners who are affected by or deliver fire management services across Victoria' (DSE 2005, p. 8). At the heart of this strategic agenda is an acknowledgement that successful fire management involves ensuring that partner stakeholders, affected businesses and communities have timely, accurate and relevant information to assist in their planning and decision making so that they can take appropriate action.

These strategic objectives are part of a whole of government approach to achieve 'greater public participation and more accountable government' (Growing Together goal, 2005) and 'improved stewardship of public and private land' (DSE Outcome, 2005).

The objectives of this research project are to:

1. map the flow of information during fire-related emergency events to emergency management partner organisations and the community;
2. identify key areas for improvement in information flows to emergency management partner organisations;
3. develop a prioritisation framework for critical information to emergency management partner organisations during critical incidents.

The research reported here was enabled through funding support from the Natural Disaster Mitigation Program (NDMP) of the Department of Transport and Regional Services (DOTARS) to support community partnerships.

1.1 Background context

A number of internal and external reviews and inquiries have identified the need for improvements to information flow, particularly to communities and other partner agencies which are affected or play an emergency services role.

The need for greater alignment between the control functions and the Victorian Emergency Management arrangements was raised by Victorian Emergency Services Commissioner Bruce Esplin, in his review of the 2002/03 Victorian Bushfires. Recommendations from this inquiry included:

- integrating community information units into incident management teams to facilitate information flow to communities;
- facilitating a better understanding between incident management teams and Municipal Emergency Response Coordination Centre arrangements; and that
- all emergency services give greater priority to information management.

In reviewing the debrief outcomes from the 2005/06 fire season, Smith (2007) recognised the improved integration and cooperation between response agencies (DSE and CFA) and also noted improvements in community engagement. This continued in the 2006/07 fire season.

A review of documentation reveals considerable effort to document information flow within various parts of the organisation and incident management system – see, for example, *Code of practice for fire management on public land* (DSE 2006a); *Issue paper on provision of fire information and intelligence* (DSE 2006b); *Emergency management framework* (DPI/DSE/PV 2006).

It is evident that progress has been made in establishing frameworks:

- for improving operational procedures in support of managing fire on public land (e.g., Implementation plan: public land fire initiative, CorpSupport 2006);
- in managing inter-agency responsibilities in emergencies (*Emergency management framework*, DPI/DSE/PV 2006); and
- in establishing working relationships across agencies in terms of ensuring seamless transition from response to recovery (State Emergency Recovery Planning Committee Framework 2006).

Initiatives from a range of internal reviews (see Attachment 1) have addressed issues of strategies developed in:

- staffing
- processes and procedures
- resources
- authorisation protocols and distribution
- VBIL and internet
- public meetings and forums
- ABC and SMS and pod casting.

These have resulted in improvements in information flow, especially to communities. For example, in comparing the community-related information flow reported in Smith's reports (2006, 2007) it can be seen that there have been considerable increases in information flow to communities. The number of calls made to the Victorian Bushfire Information Line (VBIL) in peak fire activity periods, for example, rose from 17,400 in the 2005/06 fire season to 49,000 calls in the 2006/07 season. Moreover, the call abandonment rate for the same period dropped from 19% in 2005/06 to 6% in 2006/07, despite a 2.5-fold increase in the number of calls (see Figure 1). In addition, there has been increased usage of the internet revealing the demand from the community for up-to-date and relevant information.

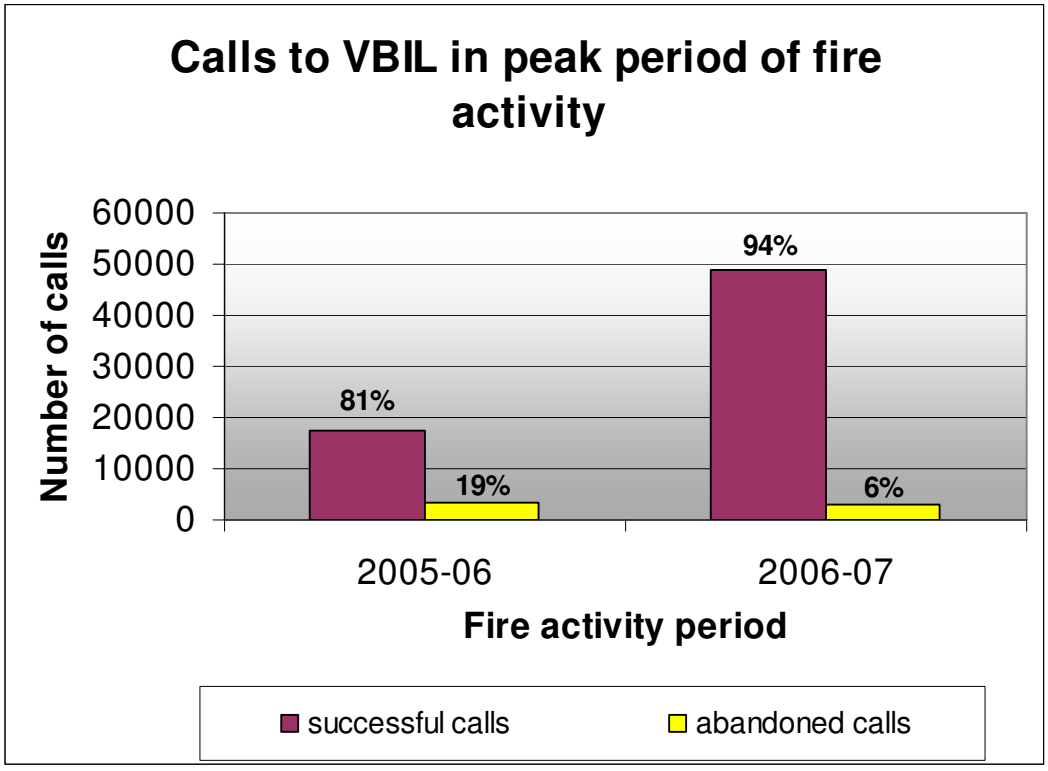

Figure 1: Comparison between 2005/06 and 2006/07 fire seasons: calls to VBIL and call-abandonment rate. Source: Smith 2007

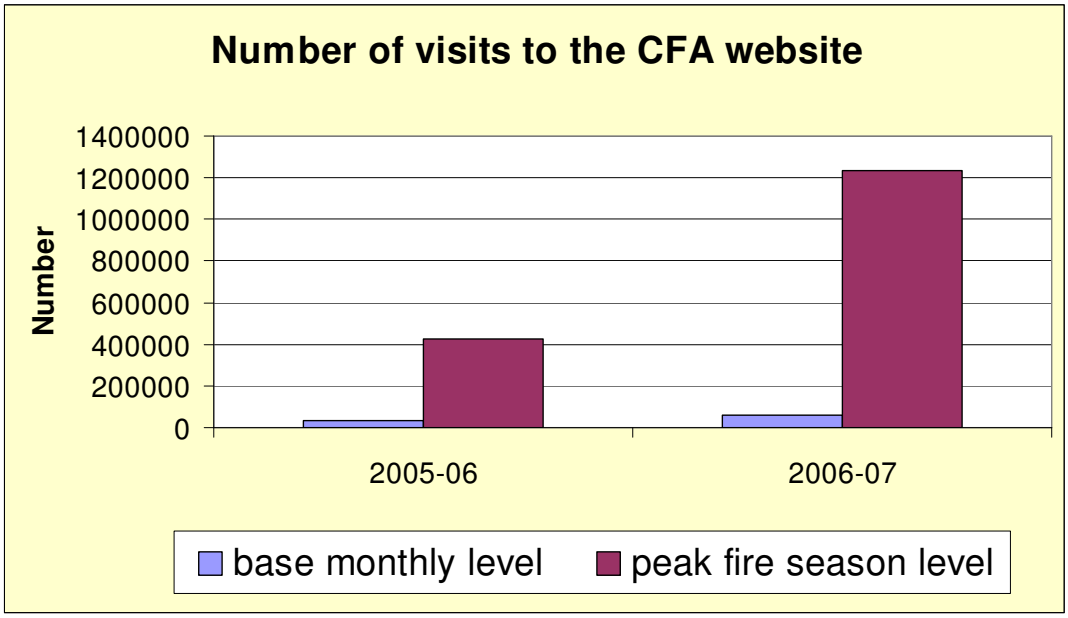

Figure 2: Comparison 2005/06 and 2006/07 fire seasons: usage of internet. Source: Smith 2007

While these statistics are compelling, senior land management from DSE Land and Fire, felt that there was still room for improvement, in particular in developing related information needs of partner organisations involved in emergency management coordination and support and those who have an emergency services role in times of fire-related emergency events.

At the heart of this issue is the need to view fire-management within a wider emergency management context. While building on the improvements in fire-related emergency response integration, Smith (2006) concluded the fire-management agencies

> *must necessarily be supported by other key participants in the emergency management arena … [A] good understanding of the capabilities and capacities of other organisations and how they mesh into the emergency management picture are intrinsic elements of sound emergency management* (p. 24).

Smith also discussed how it is important that all parties (i.e. communities, media and fire agency representatives) understand what that role is and how the information flows via the chain of command. As a result of the 2005/06 debriefs and a joint CFA/DSE strategic workshop in 2006, 'sustainability of information flow during emergency events' was still identified as a key priority (Smith 2007). This has been articulated into a plan to provide clear coordinated information (see Attachment 2).

The research reported here assists in facilitating these initiatives by:

- documenting possible communication scenarios so that appropriate ways of managing information needs can be developed prior to the fire season; and
- providing a basis for enabling the development of protocols to plan for strategic and proactive communication to executives of partner organisations as a fire develops.

2 Methods employed

2.1 Research project scope and outputs

The scope and outputs required included:

- a summary of legislative responsibilities with regards to dissemination of information;
- identification of the key internal and external information clients/audiences at local, regional and state levels;
- identification of risks to information flow and potential information flow blockages;
- identification of the triggers for the scaling up of information flow for critical information at different escalation levels, the type of information needed and the emergency management partners to be involved;
- review, with respect to information, the definition of roles and responsibilities during fire-related emergencies and the critical stages of a fire-related incident.

The following research methods were employed in order to deliver the required outputs:

- a review of documentation;
- interviews with 40 personnel (DSE and CFA) involved in fire-related emergency management during the 2006/07 fire season;
- analysis of key information needs of external emergency management partner organisations, and mapping information flows to support those needs.

2.1.1 Review of documentation

The review of documentation involved examination of:

- reports on international emergencies to extract lessons learned (Attachment 1);
- recommendations made in previous inquiries and reports pertaining to information flow to communities (extracts Attachment 4);
- legislative requirements for information dissemination to communities as set out in the Emergency Management Manual of Victoria (EMMV);
- the Australasian Fire Authorities Council Position on Bushfires and Community Safety (extracts Attachment 5);
- the Australasian Fire Authorities Council Inter-Service Incident Management System (AIIMS) manual outlining roles and responsibilities for information flow to communities (extracts Attachment 6);
- the Department of Sustainability and Environment's (2006) Code of Practice for Fire Management on Public Land (extracts Attachment 7);
- joint CFA/DSE review of effectiveness of information flow to communities and media during fire incidents (Schauble 2006);
- key issues identified from operational reviews of major fires in Victoria, 2006/07 (Smith 2006, 2007);
- information provided by the DSE on feedback received post 2006/07 fire season (analysis on this documentation Attachment 8), including:
    - notes taken at debrief meetings conducted with incident management staff, IFACC staff and community members (Gippsland, Traralgon and Swifts Creek) February–March 2007;
    - feedback submissions (n=28) completed as part of the DSE's own after action review (AAR) process, received from personnel directly involved in the 2006/07 fires. These include personnel who were:
        - undertaking information/community engagement roles at an information unit at IMT level (n=15);

- working at a regional IFACC level (n=2);
- involved with the Emergency Coordination Centre, in information unit positions (n=8); and
- from liaison/support agencies (n=3: VBIL, police, DHS)

2.1.2 Interviews

In Phase One, 40 interviews were conducted with 18 internal personnel (DSE and CFA) and 22 representatives of external emergency management partner organisations (see Attachment 3). All interviewees had direct experience in the (DSE/CFA) 2006/07 fires and many had experience in the 2005/06 fires. As indicated in Table 1, the interviewees had experience in various parts of the emergency management framework.

Table 1: Location of interviewees in emergency managements arrangements.

	Fire-related control	***Coordination arrangements (EMMV)***	***Emergency management partners***
State	10	6	6
Regional	4	2	4
Local	4	4	
Total	18	12	10

In terms of personnel involved in fire-related control, a number of DSE and some CFA personnel were interviewed who discussed their roles in the ECC (state), the IFACC (regional), as well as involvement in IMT (local) level during the 2006/07 fires. Personnel operating within the coordination arrangements, as specified in the EMMV were also interviewed. These personnel had responsibilities in a MECC (local, municipal) level, or at a Divisional (regional) level. Some had state-wide role responsibilities. Emergency management partner organisations included personnel involved in the provision of services, either to the DSE/CFA or to the communities, such as the provision of critical infrastructure.

Personnel were requested to provide an outline of their experiences and their perspectives about areas that worked well and where improvements were needed. The questions asked of interviewees can be found in Attachment 9a. In addition, respondents were asked to draw a map illustrating their understanding of how information flowed through the system and, in particular, how it flowed to emergency management partner organisations. Interviews were conducted for durations of 40 to 120 minutes and were audio-recorded. The responses were transcribed and coded against a template to capture:

- flow of information at local, regional and state levels;
- identification of information needs of emergency management partner organisations and dependencies;
- what was the content of the information and what were the possible risks; and
- for blockage and needed triggers.

Attachment 10 contains a brief synthesis of the findings from the interviews, together with some examples of extracts from the interviews that provided the data for the development of the findings discussed in the rest of the report.

2.2 Analysis and feeding back of data

In Phase Two, 10 representatives from emergency management partner organisations were repeat interviewed to confirm the emerging areas of information needed by them. The questions asked of the interviewees can be found in Attachment 9b. Tables of the key information needs of key emergency management partner organisations were developed, as were maps of information flow. The tables were returned to participants for further feedback and confirmation. Based on the information discussed, maps of information flow were developed to illustrate selected communication scenarios. These were then tested with partner representatives. It is envisaged that the templates used here (tables and maps) can be used to further develop future scenarios.

3 Lessons learned from reviews of international major incidents

This section provides a review of findings concerning information flow from inquiries into five major international emergency incidents:

1. a severe six-month flooding event in France (2001);
2. the 9/11 World Trade Center attack (2001);
3. the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003
4. the 7/7 London Underground bombings;
5. hurricane Katrina (2005)

A full summary of these findings is presented in table form in Attachment 3. Table 1 in Attachment 3 provides a summary of the four incidents reviewed in this section by providing the name of the incident, the nature of the incident, the impact of the incident and the number of agencies involved in the management of the incident. From this analysis key themes can be identified.

3.1 Pre-response: Narrow focus in learning from other emergencies

According to the literature, much can be learned from other emergencies, though direct transfer of findings can be problematic. For example, it was found in the review of the London Underground bombings on 7 July 2005 that emergency planners may have drawn the wrong lessons from the World Trade Center attacks on 9 September 2001. The report concluded that the 'most striking failure' of the emergency response was that in the case of the World Trade Center attacks many people were killed, with few survivors, whereas in the London Underground bombings a relatively small number of people were killed but there were several hundred injured survivors. As a consequence of attempting to transfer learning too directly from one incident to preparedness for another, there was a lack of planning for the injured and traumatised victims.

In addition, it is important to recognise that each type of emergency carries with it a particular set of circumstances and contingencies unique to the nature of the emergency and the specifics of the jurisdictions in which they occur.

Nevertheless, there are a number of consistent issues concerning information flow, which arise variously at all of the emergency incidents reviewed.

3.2 Response: Multi-agency difficulties in coordinating across jurisdictions

Most of the attention given in the inquiries relates to the agency response to the impact. Key lessons learned are summarised in Table 2 in Attachment 3, where the following categories of issues are identified as problematic in terms of information flow.

1. A lack of suitable communications infrastructure, including a lack of compatibility between data systems and communications technologies;
2. Communication difficulties between coordination centres and the incident ground;
3. Poor integration of different agencies' 'response' plans;
4. Poor and varied levels of situational awareness among emergency management partner organisations;
5. Systemic and personal failure;
6. Lack of timeliness and accuracy in information dissemination.

In the analysis the main reasons for these breakdowns relate, systemically, to

- what has been described as the 'ad hoc' nature of emergency response work which tends to be dynamic and uncertain;
- the asymmetrical levels of knowledge and experience between the agencies involved;
- the varying levels of familiarity with emergency response tools and procedures; and
- the often divergent knowledge of the roles and functions of individual emergency response personnel.

The exchange of timely and accurate information and the capacity of disparate agencies to find, absorb and adapt to that information is fundamental to the ability of those same agencies to integrate their activities (Comfort & Kapucu 2006).

3.3 Response and recovery: The interdependencies of impact

One of the consistent observations from the review is that although the affect of the impact in each of the emergencies was severe, so too was the loss of critical infrastructure and the subsequent damage to community functioning, making restoration and recovery a far longer process than officials envisaged.

For example, in the 9/11 World Trade Center attack, the electrical power generation and distribution system for lower Manhattan was destroyed, the water distribution system was disabled and the gas pipelines were heavily damaged. Telephone and telecommunication services were also seriously disrupted. In the London Underground bombings 3,000 adults and children were registered as suffering from post-traumatic stress, and officers in every London borough were diverted to public reassurance duties. In the severe flooding in France 15,000 people were without water for 15 days.

It is these interdependencies that highlight the criticality of the need for close interoperability which, sadly, was reported more frequently as lacking than it was present.

3.4 Lessons learned from the international literature

Comfort and Kapucu (2006, p.310) identify three basic sets of conditions which could affect the interactions between agencies involved in responding to emergency events. They are:

1. the technical structure needed to support information search and exchange;
2. the organisational policies and procedures that shape action both within and among the participating organisations;

3. cultural openness to new information, new strategies for addressing an unimaginable set of problems and willingness to adapt to extraordinarily difficult conditions.

There are some key ideas here that may be elaborated and adapted for Australian contexts.

Communications technology. There are the obvious admonitions about not relying on single providers for telecommunication infrastructure and to build in redundancy to such systems.

Building accessible information sources. One idea that draws from the post-London bombing experience is that of building extranet databases that can contain meaningful information for emergency management partner organisations and which can be accessed by them on their own on an as-needs basis. This is suggested as an alternative to attempting to build compatible technological systems that can directly share information. This same kind of database could be used to provide a source for reliable and timely information for businesses.

Public education and awareness. There is work that can be done educating the public about the use of the communications infrastructure in times of emergency, in particular, the need for the public to keep mobile communications to a minimum in times of critical response.

There are also recommendations in the literature about developing and promoting uniform alerts and warning calls and signs, and it is noted that considerable advancements have been made already by the DSE/CFA on this aspect.

Proactive media monitoring. In a number of crises, Katrina and the 9/11 World Trade Center attacks in particular, it was noted that the media were presenting inaccurate information. Information released to the media should be monitored for inaccuracies and inconsistencies (all electronic communications, including television interviews, should be time stamped). It was also suggested that the media should be involved in emergency management training exercises.

Applying new technologies. One finding from the 9/11 World Trade Center attack involved the recognition of the profound difference made in the city's ability to respond to the challenges through geographic information system (GIS) applications, which allowed graphic representations to be shared across agencies that supported rescuer and cleanup efforts.

Enhancing inter-operability. Suggestions from the literature include better training and resources for communications, information and liaison personnel. Agreeing on and committing to uniform credentials for support staff would also assist in providing for easier integration of recovery services.

These improvements, as well as other particular aspects that can be gleaned from Table 3 in Attachment 3, provide a means enabling response and recovery personnel to build a shared awareness of the issues before, during and after events.

4 Review of roles and responsibility

The Forests Act gives the DSE its powers/legislative responsibility for managing fire-related emergencies on Public Land in Victoria. Processes for managing emergencies are supported by the *Emergency Management Act (1986)* and the Emergency Management Manual of Victoria (EMMV).

The Manual distinguishes between the agency responsible for the emergency (the control agency) and other agencies that are designated as having a 'support role'. The manual defines a control agency as:

> *'the agency nominated to control the response activities for a specified emergency'* and a support agency as '*a government or non-government agency which provides essential services, personnel, or material to support or assist a control or another support agency or persons affected by an emergency*' (EMMV 2003, pp. 3–4).

In fires on public land (i.e., for all fires in Victoria that occur in State forest, National Parks and Protected Public Lands), the DSE is identified in the EMMV as being the control agency. Victorian Government agencies, such as Parks Victoria (PV), Department of Primary Industries (DPI), Melbourne Water, VicForests (VF), form part of what is referred to in policy documentation as Networked Emergency Organisation (NEO) partner organisations. These agencies work with the DSE to contribute crews to control activities. Throughout the rest of this report they will be referred to as NEO agencies. NEO agencies, together with the Country Fire Authority (CFA), Metropolitan Fire and Emergency Services Board (MFESB) are named as support agencies in the EMMV (see Table 2). For fire occurring outside these areas but within the Country Area of Victoria, the CFA is designated as the control agency and the DSE is listed as the primary support agency (Smith 2007, pp. 7–31).

Table 2: Responsibility for fire and/or explosion. Source: EMMV, Section 7, 2007

FIRE AND/OR EXPLOSION		
Emergency	Control Agency (varies by location)	Support Agencies
Explosion	CFA/MFESB	DPI
Fire (on public land)	DSE	Parks Victoria, DPI, Melbourne Water, VF CFA, MFESB

The DSE works closely with the CFA when there are multiple fires and the current practice is for these agencies to share responsibility for fire control functions (CFA.DSE 2006). Doing so allows the combat agencies to share responsibility for different fires and to coordinate their actions through their respective Regional and State levels of coordination.

A number of after-action reviews (see, for example, Smith 2006, 2007) have noted the increasing cooperation and enhanced integration of fire response between the DSE and the CFA. For example, in the 2006/07 fires, a new coordinating mechanism known as the *CFA/DSE IMT support desk* was set up for the first time in the DSE Emergency Coordination Centre (ECC). This unit serviced both DSE-led and CFA-led fire-fighting efforts. For the purposes of this report, references to agencies fulfilling a fire control function in bushfire-

fighting will refer to both DSE and CFA, though it is acknowledged that the DSE sponsored this research with support from the Natural Disaster Mitigation Program.

4.1 Organising for emergency management response

Both the DSE and the CFA are committed to using the Australasian Inter-Service Incident Management System (AIIMS) as the framework for managing fire-related emergency events (AFAC 2005, see Attachment 11). AIIMS is described as '*a common management framework to assist with the effective and efficient control of incidents'* (AFAC, 2005, p 14). The AIIMS manual (2005, p. 10) defines control, command and coordination of an incident:

> *Control is the overall direction of emergency management activities in an emergency situation. Authority for control is established in legislation and may be in an emergency plan and carries with it the responsibility for tasking other organisations in accordance with the needs of the situation. Control relates to situation and operates horizontally across organisations.*
>
> *Command is the internal direction of the members and resources of an agency in the performance of the organisation's roles and tasks by agreement and in accordance with relevant legislation. Command operates vertically within an organisation.*
>
> *Coordination is the bringing together of organisations and other resources to support an emergency management response. It involves the systematic acquisition and application of resources (organisational, human and equipment) in an emergency.*

AIIMS provides a common management system, the principal component of which is the Incident Management Team (IMT). The AFAC AIIMS manual notes that the ultimate responsibility for managing an incident always remains with the Incident Controller *'whether an Incident Management Team has been established or not'* (AIIMS, p. 29). An IMT will be activated when the incident escalates to a level of complexity that requires the management and coordination of resources. When an IMT is activated it consists of four sections: control, planning, operations and logistics. In addition to the Incident Controller having '*overall responsibility for the management of all activities undertaken to control the incident'* (AIIMS, p. 25) the Incident Controller also has responsibility for the:

- *management of the interface with organisations and people working outside the incident management structure*; and the
- *management of the interface with organisations, communities and people affected by, or likely to be affected by, the incident'* (AFAC 2005, p. 25).

When an IMT is activated the management of the information flow from within the IMT to emergency management partner organisations takes place in the Information Unit, established within the Planning Section. The Information Unit is responsible for information flows outlined in Figure 3, extracted from AIIMS manual.

The key function of the Information Unit is to provide timely, accurate and relevant information in regard to the incident's cause, size current situation to a range of stakeholders, including government, other agencies and locally affected and broader community. It is the first point of contact for the media, the public and other agencies for general information about the incident (AIIMS manual 2005).

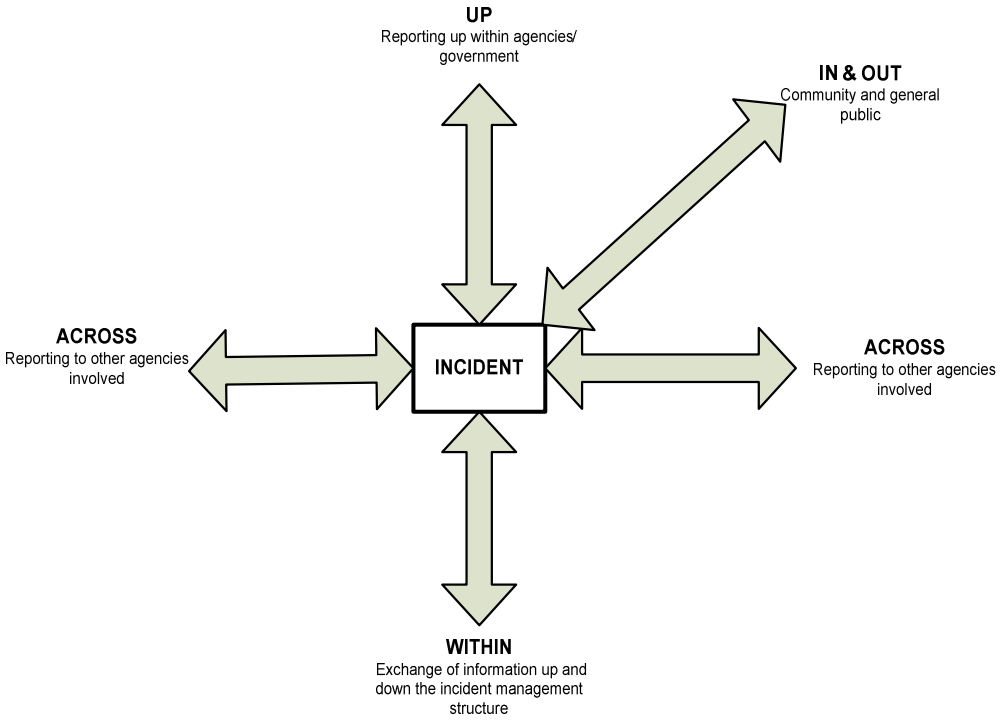

Figure 3: Information Unit information flow responsibility.
Source: AFAC 2005, p. 45

Considerable work over the past few years has gone into developing the capability of the Information Unit. In 2007 the DSE and the CFA jointly prepared a set of Guidelines to articulate responsibilities and protocols as an enabler to developing a fully integrated information service (yet to be fully realised). The Guidelines for the AIIMS Information Unit (2007) specify the size and composition of staff and lateral linkages to the Integrated Fire Agency Coordination Centre (IFACC) in terms of the DSE and the Regional Emergency Coordination Centre (RECC) in the case of the CFA. Figures portraying these relationships as described in the Guidelines are found in Attachment 12.

To address deficiencies in information flow identified in previous inquiries (see for example Smith 2006, 2007) particularly to the community, the Information Unit has developed a sophisticated array of tools and dissemination strategies. The personnel employed within an Information Unit have also grown to a considerable extent as the delineation of roles for specific purposes continues to mature (see Figure 4).

Attachment 12 also provides illustration of how, in the course of the commencement of a fire designated as a Level 1 or Level 2 incident, an Information Officer will work with an Incident Controller prior to the activation of the IMT. Once the IMT is established the Information Unit sits within the Planning Section. Figure 4 provides a representation of the Information Unit and its personnel in a Level 3 incident.

In the interviews conducted with DSE staff (and in the post 2006/07 fire season review documentation included in Attachment 8), there appears to be some confusion about where the Information Unit sits within the AIIMS structure. Some personnel thought that the Information Unit reported (within AIIMS) directly to the Incident Controller, and if this was not the case, then it needed to be so.

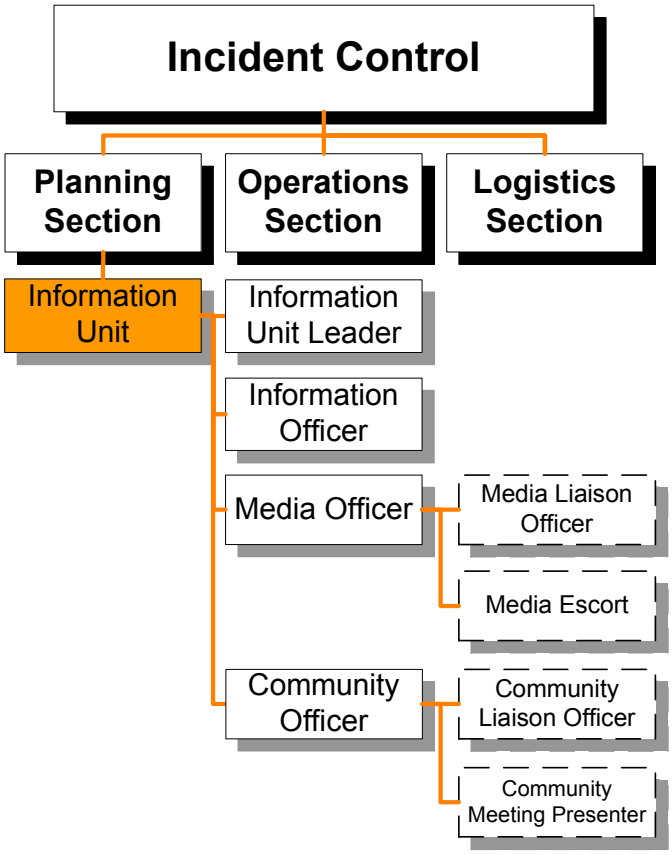

Figure 4: Position of the Information Unit and personnel in the IMT in a Level 2/3 incident. Source: Information Unit Guidelines 2007

In recognition of the importance of the need for good information management, the authors are aware that the role of the Information Unit and its reporting position is also under internal review to consider whether the Information Unit should report directly to the Incident Controller. In reviewing the Information Unit Guidelines, the Project Team concur with the sentiments expressed earlier, that a strong relationship is needed between the Information Unit section and the Incident Controller, and thus conclude that a revision of AIIMS is worthy of consideration.

However, the critical issue is that all sections within an Incident Management Team need to be operating as a fully integrated unit for the team to work effectively. Only when all units and functions effectively share informational resources efficiently will the entire performance of the whole Incident Management Team be lifted. Changing the reporting structure of one unit will not fix a deeper systemic problem of information flow within an Incident Management Team. The risk is that parallel information processing begins to occur, which would seem to constitute a greater risk to achieving successful outcomes than solving an information flow problem by moving the Information Unit. It seems important to address internal mechanisms with information flow within the planning unit of the IMT, as will be discussed later in the report.

There are other impediments to information flow between the IMT and the Community. In a couple of interviews (i.e., a minority) there were reports of Incident Controllers who did not seem to share the importance of keeping the community well informed. From the perspective of these respondents, there are still Incident Controllers operating in the system who believe that community members will panic if they are advised of the fire situation. In one particular case, difficulties in being able to access the Incident Controller were exacerbated by a Planning Officer who was not fully forthcoming about what was discussed in the briefings, from which the Information Unit were excluded. Under these circumstances it was very difficult for an Information Unit section to be effectively performing.

That said, it is important that a decision to shift the Information Unit reporting is not made because of the occasional ineffectiveness that has been reported; or because of a lack of appreciation of the Information Unit role by other members of the IMT. The above case example indicates that there were probably other aspects of that IMT that were not working well, and extracting the Information Unit would probably have only resolved some of the teamwork difficulties. It is important that Information Unit staff see themselves as part of a fully functioning team and that they have the confidence to speak up if their needs are not met such that the effectiveness of their own job function is jeopardised. There are protocols that have been developed in other high-reliability industries to facilitate making a demand, particularly when there is a high power-distance between members of the team. These enable staff members with low power/authority to speak up if they see something that has been observed and is going wrong.

In terms of the Victorian Emergency Management Framework, it is interesting to note that the EMMV does not explicitly identify control agencies (such as the DSE or the CFA) as having a responsibility to provide information to the community; however, the AFAC AIIMS policy does. In part, this is because the Emergency Management Act and the EMMV were developed before the implementation of AIIMS and possibly because of state-national differences in conceptualising the issues.

In the EMMV, the arrangements and responsibility for warning the community lies within the local municipal council. Part 4 of the Emergency Management Act specifies the legislative requirements of councils, who among other activities must '*appoint one or more Municipal Emergency Resource Officers (MERO) to coordinate the use of municipal resources for emergency response and recovery*' (EMMV 2001, S6–24).

According to the EMMV (2006, S6–32), council response activities include:

- Establishing and operating centres and facilities such as a Municipal Emergency Coordination Centre (MECC), and
- Facilitating the provision of information:
    - as warnings to the community in consultation with other agencies; and
    - as information to public and media in consultation with control agencies.

Given the growth and success of the Information Units within the control agencies in providing information to support emergency management partner organisations and to the community during the two previous fire seasons (see Smith 2007), it will be important to clarify roles and responsibilities in coordinating information sharing between Information Units and between fire control agencies and their counterparts in the MECC. Information disseminated to the community needs to be role-specific to ensure information provision is systematically managed across the emergency partner organisations to reflect roles and responsibilities. There is a risk if MECCs, for example, begin providing warnings about a fire-hazard. Likewise, there is a risk if control agencies create bottlenecks to information being disseminated to

support communities. This will be discussed in the next section, having first elaborated on the variety of partner organisations, other stakeholders and their information needs.

4.2 Clients/audiences and their information needs

In this report various audiences who represent different 'communities of interest' have been identified, all of whom have a stake in (a) helping the DSE to manage fire-related incidents as effectively as possible, and (b) expecting to be kept informed about that management so that they can make their own decisions and take their own actions. The audiences are wider than those listed in the EMMV, taking account of the differing interests and subsequent roles and responsibilities different audiences will be involved with.

From the perspective of the fire control agencies, those audiences are either internal or external to their operation and either directly or peripherally involved in the event. Table 3 provides an overview of the kinds of audiences, identifying the type of audience and their different roles in the event.

Table 3: Types of audiences.

Type of audience	Examples of agencies/stakeholders
Internal audience critical to fire control of the event	Fire-fighters on the fire-ground; Regional/State levels of fire control agencies
Other agencies (internal and external) with direct support to operational activities	SES, Vic Police, NEO agencies, MFESB, Local Government, CFA
Other agencies (internal and external) with inter-dependent emergency management roles	DHS, NEO agencies, Dept for Victorian Communities, Local Government, CFA (Regional and Groups remaining for additional surge demands)
Critical infrastructure	Water Authorities, National Electricity Market Management Company (NEMMCO), The Victorian Energy Networks Corporation (VENCorp), aviation points, Telstra, Rail links and key cables, gas
Other levels of government and private businesses	Those agencies and private business operators who are directly or indirectly affected (e.g., tourist operators, including alpine resorts; beekeepers)
Political sphere	Office for the Emergency Services Commissioner; Victorian Emergency Management Group; Members of Parliament (locally affected); Ministers; government
Community members	Community members who are directly affected through threat, or impact of fire or smoke; those who are indirectly affected and the general public.

As can be seen from the above table, there are groups of clients or audiences that will have different needs based on their different levels of involvement in the event and its proximity to their interest. These audiences may include fire-fighters on the fire-ground, as well as emergency management partner organisations involved in supporting operational requirements (e.g. SES). Other emergency management partner organisations such as the DHS have a role to play in the emergency management effort. Other agencies may have

roles involved in the supply of critical infrastructure that may be directly or indirectly impacted, or have a general business that is likely to be affected. The political sphere of government also needs to be kept informed in order to consider the broader impacts and contingencies for all levels of the community. In addition there are members of the general public who, depending on their proximity to the fire, will have differing information needs.

According to the EMMV, an incident involves several overlapping activities. The Emergency Management Act emphasises the need to '*ensure that prevention, response and recovery are organised within a structure which facilitates planning, preparedness, operational coordination and community participation*' (S4A). In this regard, it is important to situate control agency response activity within a suite of complementary activity involving emergency preparation and recovery. The EMMV defines prevention, response and recovery, '*not as phases or stages of emergency management … [but] as clusters of activities. They take place as needed, and do not necessarily follow one another in a sequential order*' (EMMV, pp.1–7). These clusters of activity are illustrated in
Figure **5**.

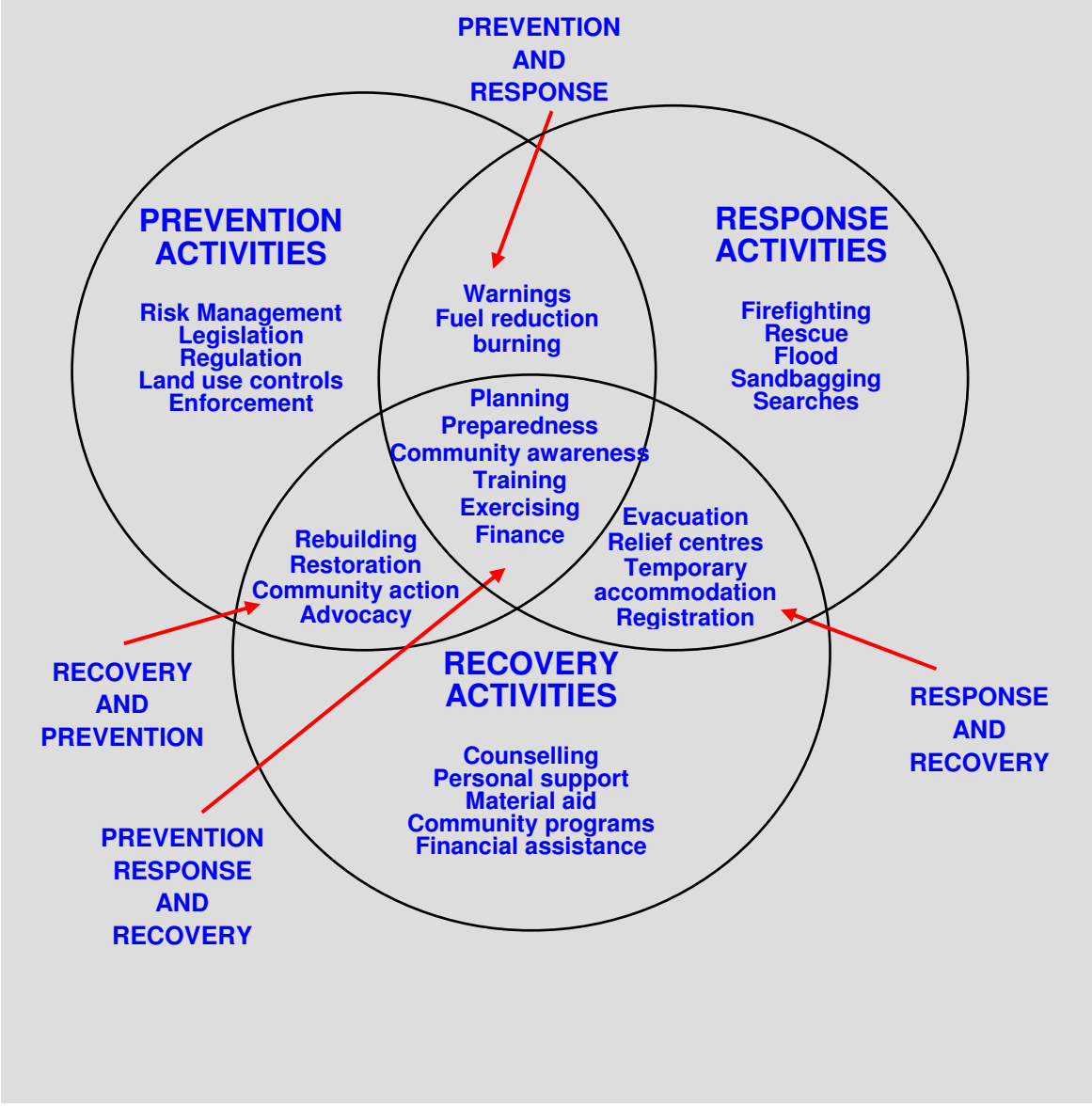

Figure 5: Examples of emergency management activities.
Source: EMMV 1–6

Table 4 outlines seven activities that occur during an incident, which include pre-response through the course of the fire and its impact, as well as recovery and normalisation. For purposes of reporting these activities, they are presented in layers as a 'snapshot', but this is not to suggest that these activities occur in a linear manner. As indicated in Figure **5**, the activities overlap.

The table shows the roles and responsibilities and the lateral relationships between each of the key personnel during the various activities of the incident, as designated in the policy documentation reviewed. It is interesting to note that the policy documents reviewed do not specify how an Incident Controller at the ICC (local level of response control), or the State Duty Officer at the ECC (state level of response coordination), requests activation of the municipal support and coordination body (MECC) or what triggers are needed for this process to occur.

The EMMV identifies that the MERC activates the MECC. However, there are also no explicit references to provide guidance as to how a MECC might escalate its activities and scale up, as there is in the AIIMS framework for managing incident response for control agencies. Development of these guidelines would be useful, both for personnel within a MECC, as well as for personnel in an IMT.

Table 4: Roles and responsibility for information flow, and source of authority

Activity occurring in incident	Role	Responsibility	Lateral Role relationships	Source
Pre response	DSE/CFA Community Education/preparedness	Community Engagement Officer	PV, local councils and regional bodies	DSE Community Engagement policy
Initial response/ notification	Response and Incident management	Incident Controller	MERC.(MECC)	AIIMS, EMMV
	Notification of estab of IMT	Incident Controller	SDO (ECC) CFA/SECC	
	Notification to establish activation of a MECC	MERC	DERC Council IC	EMMV
Escalation	Notification to communities likely to be affected	Incident Controller	SDO (ECC/ DO/IFACC) CFA (SECC) MERC (MECC)	AIIMS EMMV
	SEWS warning	Incident Controller advice to MERC MERC to authorise	MERC (MECC) SDO (ECC)	EMMV
	Notification to external partner organisations	Incident Controller	MERC (MECC)	AIIMS
Engagement/ Containment	Management of the incident	Incident Controller	MERC (MECC) DERC (DEC)	AIIMS, Heads of agreement (DSE/CFA)
Mopping up/ Post impact	Management of de-escalation of incident	Incident Controller	Department of Human Services MERC (MECC)	EMMV, DHS
	Transition to authority of recovery agencies	Jointly convened meeting, control agency+ LGA + DHS	Local Government Authority (LGA), Department of Human Services (DHS) DPI	DSE/CFA/DHS Framework for transition from response to recovery, 2006
Recovery	Support communities to achieve normal community activities	Recovery Co-coordinator (LGA)	Department of Human Services	DSE/CFA/DHS Framework for transition from response to recovery, 2006
Normalisation	Support communities to achieve normal community activities	Local government authority	Department of Human Services	DSE/CFA/DHS Framework for transition from response to recovery, 2006

5 Identifying information needs of partner organisations in emergency services

Table 5 provides a synopsis of the types of information identified as important by the emergency management partner organisations interviewed. The template used here was developed from one previously employed in an earlier project to identify resource tracking requirements, conducted by the Office for the Emergency Services Commissioner. The template was then embellished from the information needs identified in consultation with emergency management partner organisations in the event of a fire-related event. This template was then circulated to representatives from emergency partner organisations for their comment/validation. This constituted the second phase of the data gathering process.

In consulting emergency management partners about their information needs, a broad range of needs were identified. It should be noted that the themes identified here were ones raised in the interviews and then respondents were canvassed about whether or not they thought their agency would benefit from having this information. Although some of the sources of who would provide such information are obvious, agency respondents were not asked who they thought should provide this information. It should also be pointed out that no emergency partner expected that the DSE would be the source of all types of information. The information needs identified in the consultation process were grouped around five themes:

- *Emergency information:* pertaining to the dynamic changes occurring to manage the event as well as information about the event itself (e.g., the emergency management arrangements in place, the plans in use, the assets at risk, predictions of the fire and its behaviour);
- *Combat agency and operational Information:* pertaining to the control agency's operational needs (e.g., personnel involved, catering requirements);
- *Community information needs:* details included in the incident information plan, such as meetings planned, distribution deadlines for newsletters;
- *Community needs:* demographic profile; emergency relief centres, recovery centres, requirements for habitation, road closures, warnings, alternative arrangements in, e.g. school transportation system;
- *Health-related needs:* such as smoke concentration, plume modelling, livestock losses.

In Phase Two of the research, 13 agencies were invited to review the collated information needs and to identify what was important for that partner. To date, 10 agencies have responded (Municipalities, Vic Police, DHS, DPI, Telstra, Melbourne Water, ABC, Victoria Tourism, Parks Victoria, and electricity companies) and their results are collated in Attachment 13.

Perhaps not surprisingly all agencies that have responded to date have identified the need to understand the nature of the event (emergency information) as well as the strategies in place to manage it. In terms of the operational needs of the combat agency, all agencies responding to date wanted to know about road closures and road access. Community information needs and health-related needs were more specific and localised (e.g., of interest to municipalities and DHS respectively). However, most agencies nominated wanting to have information on the community's information needs. All details are reported in Attachment 13.

Table 5: Agencies' information needs

INFORMATION NEEDS	DEFINITIONS/EXAMPLES	Requested by all agencies
Emergency information Information that is critical to the management of resources during a major, multi-agency emergency (i.e. dynamic changes in the following).		
Controlling agency	The agency that is in control/lead of the emergency at any given time (e.g. under CFA direction).	*
Emergency management system	Contact detail with management structure of individual agencies. The control/recovery structure of the incident.	*
Weather	Information relating to weather behaviour including that information that is provided by agencies such as the Bureau of Meteorology and mobile weather stations established in response to a particular emergency (e.g. forecasted humidity, wind changes, cold fronts, etc).	
Fire prediction & fire behaviour	Information relating to the likely behaviour of the fire (e.g. expect doubling of scale of outbreak by 1700 hours). Information relating to the behaviour of the fire such as extent of fire, fire prevention and control activities, etc (e.g. fire perimeter changes).	*
Situation reports	Information relating to the current situation of the fire including weather and any emergency related communication, impact, recovery and rehabilitation plans (e.g. establishing a back burn of 5km in length before 1600 hours).	*
Mapping	Information of a geospatial nature that impacts on the management of resources. Includes such things as extent of emergency, fire breaks, road closures, plume modelling, etc (e.g. show on a map the local history of fuel reduction burns that have occurred).	
Readiness & response pre-emergency plans	Any pre-prepared plans that impact on the management of resource once an emergency commences (e.g. Municipal Fire Management Plan, etc).	
Infrastructure assets at risk	Information that provides a detailed account of structures at risk (e.g. hospitals, prisons, houses, holiday homes)	*
Assets at risk	Information that outlines the various strategies that are developed in response to the emergency, key and risk exposures should the incident behave in a particular manner (e.g. if the fire is to head in a north-west direction then a fire break needs to be established along Smith Road, etc).This includes Incident Action Plans (1–3 days out) and Strategic Plans (3–7 days out) detailing plans of attack, roads/bridges to be used, environmental (natural/human built)/ heritage assets at risk.	
Emergency management changes	Information relating to the emergency controlling authority and any changes to this during the course of the emergency (e.g. the fire was initially under the direction of DSE but is currently under the direction of CFA).	*

INFORMATION NEEDS	DEFINITIONS/EXAMPLES	Requested by all agencies
Single agency emergencies	Information that outlines all the current emergencies that individual agencies are attending at any given time (e.g. the CFA currently has 12 emergencies under its direction).	
Combat agency – Operational		
Competing resource priorities	Information that identifies all current emergencies and therefore the resources that are being utilised at these various emergencies (e.g. there are 40 personnel currently working on the Heyfield fire, etc).	
Resourcing needs	Information that outlines the needs of the combat/recovery agency. This includes the setting up of the staging areas, bulldozers, appliances, water tankers and communications.	
Personnel	Information that provides the location and number of personnel involved directly in fire-fighting.	
Catering requirements	Information that covers meal break times, the number of meals required and any special dietary requirements.	
Road closures/access	Information that provides agencies with locations of road/bridge closure/access and weight limitations of those roads/bridges. This information also includes traffic management points limiting access to unauthorised individuals.	*
Community information needs		
Community meetings	The locations and times of the meetings. Which personnel will be at the meetings (e.g. IC, Community Liaison Officer, Police)	
Newsletters	Information that needs to be disseminated to the community - allowing time for printing and distribution.	
Community needs		
Evacuation/Assembly points	Information that provides the locations of evacuation/assembly points for the community. This should also include the re-location of hospitals and prisons.	
Dwelling losses/damage	Information that provides a detailed account of structural damage/loss. This information covers the number of houses, caravans, holiday homes, sheds, garages that are damaged and/or lost, and the extent of damage.	
Requirements for habitation	Information that reports on the provisions required to enable a community to function adequately in an emergency (e.g. generators, water, pumps).	
Demographic profile	Demographic information on the diverse population (e.g. culture, aged care, special needs).	
Health related needs		
Smoke impact / Ember attack	Information that provides detailed readings of air pollution, visibility and smoke plume modelling. This also includes weather modelling that indicates what locations may be impacted (weather direction), smoke dispersal information and height of inversions (key smoke concentration elevations).	
Livestock	Information that relates to livestock loss and the disposal of the live stock (e.g. type of livestock, location and numbers)	

*Denotes information required by all agencies

As discussed previously, it is important for all partners to have clarity about role-specific information and to know which agency is responsible for its provision. It is also important to be clear about where expertise is available and to have clear expectations about role boundaries and responsibilities between partner agencies. Development of a mutually accessible database for emergency partner organisations, such as that suggested in the international literature review, may warrant further investigation.

It is equally important that no attempt is made to centralise public messaging. Agencies need to be able to speak about their own role responsibilities and their assessments based on their expertise. This is important at times of limited resources and when an event is escalating.

It was interesting to note that in the London bombings it was important that the agencies responsible for delivering specific services were able to publicly speak about what they were dealing with. The importance of public comment within the boundaries of an agencies role responsibility enables services to communicate in a way that does not send mixed messages.

5.1 Satisfaction with information flow by emergency management partner organisations

As part of the consultation, emergency management partner organisations were also asked to comment on their levels of satisfaction with

- whether information needs are currently being met;
- the modality currently used to disseminate information;
- the timeliness of information received; and
- the relevance of information received.

It can be seen from Attachment 14 that overall there is general satisfaction with the information provided, although there are some areas in need of improvement, particularly with the DHS. These issues pertained largely to the kind of information the DHS needs to support its Rapid Assessment Teams. While emergency management partner organisations were satisfied in general that their needs were being met and that the information provided was relevant, timeliness was still an issue. Dissatisfaction with the timeliness of the information received appears to be an issue for most of the agencies consulted.

Included in Attachment 14 are suggestions from relevant agencies for improvement to meet their particular needs. Given the complexity of information needs and the specific nature of those needs, the following section will map information flow for particular types of information need scenarios. Before doing so, it is important to gain an overall picture of the various emergency management partner organisations and their relationships to one another.

6 Modelling information flows

Given the complexity involved in the variety of agencies, their responsibilities and their diversity of roles in an emergency services context, the difficulty of attempting to model information flows should come as no surprise. The following section will provide a schematic outline only of information flows between partner agencies. To appreciate the various complexities, particularly in coordination and collaboration required for inter-operability, it is worth giving some attention to the variety of possible boundaries that need to be crossed to provide effective inter-agency incident management. Table 6 provides a summary of some of the main partner agencies and their administrative divisions.

Table 6: Selected Fire and Emergency Service Partner Agency Boundaries

Agency	Administrative boundaries
DSE	5 regions 22 Districts
CFA	9 areas 20 regions
DHS	8 regions
Parks Vic	5 regions
Local Govt Municipalities	86 municipalities
Vic Roads	7 regions
Vic Pol	5 regions

Figure 6: Administrative boundaries of DSE, local municipalities and Parks Vic

In addition, there are other utilities involved, for example gas, electricity, water, telecommunications. In the case of gas there are 25 entities involved (8 in transmission, 3 in distribution and the remainder retail or production/storage). To add more complexity, none of the geographical administrative boundaries of various agencies even overlap. Figure 6 highlights the complexity by mapping the administrative, geographical regions of some of the agencies listed in Table 6 (DSE, local municipalities and Parks Victoria). Given that, in addition to geographical boundaries, there are added functional, technological and cultural boundaries, it is little wonder that achieving integrated service delivery requires considerable effort.

In this section then only a brief functional schema will be attempted. In order to address the various levels of information flow needed within the relevant agencies, as well as the inter-dependencies between those agencies involved, a template was developed to provide a means of mapping those relationships. Table 7 begins to differentiate some of the aspects that need to be taken into consideration.

On the one hand, there is a need to differentiate between fire control functions, coordination and support functions and the linkages needed between those layers of activity. The activity occurring within and between these layers and functions also needs to convey information to emergency management partner organisations who have involvement in management or resourcing aspects of the fire-related event, as well as to members of different communities.

Table 7: Template for mapping information flows.

Level	***General community***	***Fire control responsibility***	***Emergency management arrangements (EMMV)***	***Emergency management partners***
State	General public	State (e.g. ECC/SECC	SERCC	ECC
Regional	Affected health/tourism	(IFACC/RECC)	DECC	REOC
Local	Direct impact (before, during, after)	Local (ICC)	MECC	

In the first column Table 7 shows the levels of focus (local, regional, state). In terms of the general public, the local community will be those members who are directly affected, before, during and after a fire-related event. At a regional level there may be members of the public who need to be aware of smoke concentrations and need to be prepared to activate their own fire plans, should the fire move in their direction. There are going to be holiday-makers interested in both the fire-affected local areas, as well as the potentially fire-affected region. In

addition, there are business operators who have information needs in terms of the real and potential impacts on their business of a fire in the vicinity (e.g., tourist operators, beekeepers, wine-makers). At a state level there is general community interest. Within the general community there may be concerned families needing information on their lived ones involved in a fire impact. Given the importance of information flow to the communities, it is discussed in a separate chapter later in this report.

The fire control structure also operates at state, regional and local levels. The state level (ECC) will be on stand-by on high fire-danger days, even before an event commences in a locality. When a fire commences, there will be a local response involving fire-fighting on the fire-ground. In the initial phase the Incident Controller will perform all functions of an IMT. If the complexity of the fire is beyond a Level One, an Incident control Centre (ICC) will be established, with support from the regional level and the ECC. When there are multiple fires requiring multiple ICC and the Regional Emergency Coordination Centre (RECC) has exceeded its capacity, the Regional Duty Officer (RDO) will establish an Integrated Fire Agency Co-ordination Centre (IFACC) to be established to coordinate between the multiple ICCs. Within the Coordination and Support functions of emergency management, there is a continuum of emergency management partnership. Some agencies will be heavily involved because of their designated roles and responsibilities (see section 4) others only when their particular infrastructure or organisational interests are impacted.

In the responsibilities outlined in the EMMV, when necessary, a MECC will be established; and if necessary, a regional equivalent, a Divisional Emergency Co-ordination centre. At a state level, should a state of emergency be declared, the State Emergency Response Coordination Centre acts at the interface of coordination and support agencies and the political sphere as does the ECC.

6.1 Mapping information flow within and between elements in the incident management system

Figure 7 shows the different areas of responsibility (fire control, coordination and support) as well as specialised emergency management partner interests. As can be seen from the figure, the differing lenses illustrate information flow with that component of agencies involved in the emergency management arrangements. The Figure also illustrates the ways in which these arrangements are nested and overlapping. The following section discusses these interdependencies.

Information flow from the fire control agency functions to the community are discussed in section 7. Figure 8 maps how information gets to and from the information unit (the unit responsible for information flow) to emergency management partner organisations and the community, according to how it is described in the Information Unit guidelines.

Figure 9 provides a picture of the linkages between the fire control agency activities (and their respective regional and state levels of fire-related coordination). Figure 10 maps how information flows between fire control agencies, emergency management partner organisations. It will do so by working through the information flow arrangements needed in four different scenarios.

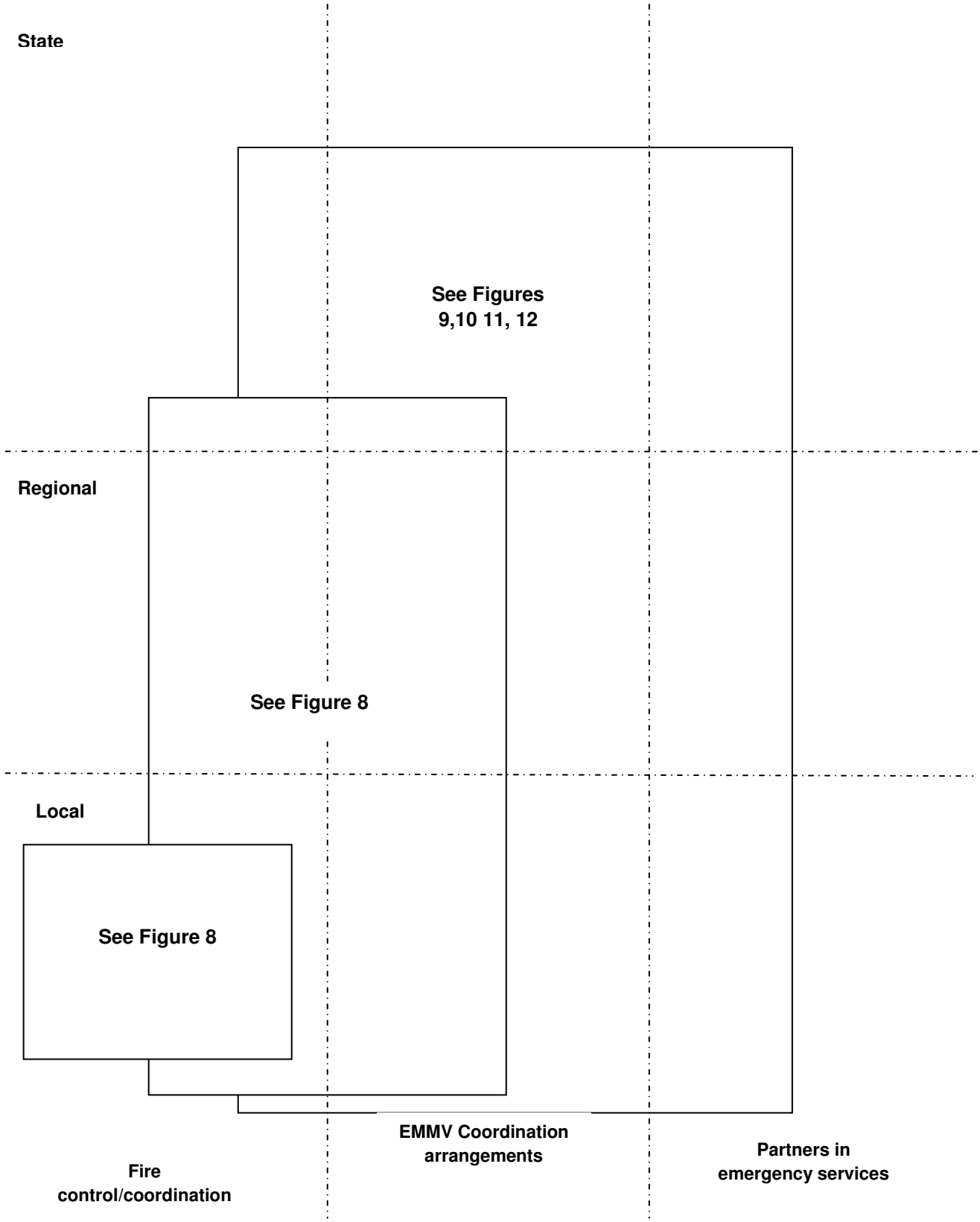

Figure 7: Mapping emergency management relationships in fire-related events

6.1.1 Mapping information flow in fire control at the local level

This section first maps the way in which information flows through the fire control agency responsible at the local level according to the Information Unit guidelines, since it is the Information Unit that is responsible for information flow to Emergency Management Partner Organisations. Figure 8 represents the information flow into, within and out of the Information Unit within the Planning Section in an IMT during an incident.[1] The figure shows that the Information Officer receives information from a number of sources. Information is obtained from the incident itself via the Operations Section, the Resources and Situation Units in the Planning Section and a variety of supporting and variously affected partners, such as the local, regional and general community, local governments, police, ambulance, utilities and infrastructure managers.

An Information Officer is required to gather and disseminate information within an IMT to and from other DSE Coordination Centres, to/from the community, to/from the media and to/from other relevant organisations, such as the CFA. The duties 'normally undertaken' by the Information Officer and indicated in Figure 8 are:

- Liaise with the Planning Officer (and other Information Unit members), Incident Controller and Situation Officers to obtain the latest incident information. This information consists of:
  - Name of fire
  - Location of fire
  - Size of fire
  - Assets under threat and impacted by fire (including towns, farms, bridges, infrastructures, people parks, stock, plantations, historic and cultural heritage, endangered species, houses, forest, wildlife)
  - When and how the fire started
  - Weather conditions and forecast
  - Agencies involved and resources committed
  - Strategies in place to control the fire
  - Other points of interest (if time permits) such as the use of specialist equipment, technical specialists, fire history of the area, fire ecology and the adaptability of plants and animals and the importance of fire in the natural environment.
- Based on the information received, the Information Officer is responsible for the creation and implementation of an **incident information plan** (IIP) and the compilation, synthesis and construction of information to be released to the various partner organisations. An IIP identifies *'which planned dissemination tools can be usefully deployed during the incident, and what critical messages need to be carried to the public in the threat area'* (Information Unit Workbook 06/07, p. 9). An IIP should contain the following information:
  - Incident name
  - Date/Time/Shift
  - Information Officer name
  - Information Unit Staff, contact details and shift times
  - Situation summary
  - Information Unit objective
  - Information Unit strategies and tactics (what, who, how, by when and where)
  - Critical issues (warnings and alerts)
- Obtain authorisation from the Incident Controller to enact IIP

[1] For a Level 2 incident developing into a Level 3 incident.

- Distribute the IIP to the Planning Officer and the ECC Information Unit.
- If deemed necessary, the roles of Media Liaison Officer (MLO) and Community Liaison Officer (CLO) may be created to disseminate information to their respective audiences; the media and community.

Both the IIP and media releases are conveyed by the Planning Officer to the Incident Controller for the purposes of informing as well as authorising for release. The approved IIP is then returned to the Information Unit for implementation, which is monitored by the Information Officer who in turn advises the Planning Officer of the IIP's progress. Meanwhile, information is disseminated to the various stakeholders via a combination of the following Information Unit roles (as outlined in the Guidelines, 2007): Media Liaison Officer, Community Liaison Officer and Community Meeting Presenter.

Figure 7 highlights one of the information risks identified previously, in that there is no designated function that has responsibility for conveying information to the emergency management partner organisations represented in the Municipal Emergency Coordination Centre (MECC).

It is clear from reading the document that the intent of the IIP is for an internal readership and appears to be one for logging purposes. The IIP could become a more strategic dissemination tool with further development. Parts of the IIP could reflect different stages of the emergency that is sent to partner organisations providing information on strategies that are being enacted. It could include high priority critical targets as well as key messages for partner organisations.

The IIP is the vehicle used to obtain authorisation for information release. Given the earlier discussion about the difficulty of delivering timely messages and the various layers of authorisation required within the command and control structure for certain types of information, it may be possible to develop a protocol where the release of information is pre-approved, provided there is no substantial addition of new content. For example, the release of information authorised by an IC within an IMT to be distributed to external sources immediately and concurrently sent to regional and state levels of control agency for their information.

It is also interesting to note that there does not appear to be a strong relationship between the Situation Unit and the Information Unit in pooling and making meaning out of information gathered. Strengthening the role of the Situation Unit in being a key source of information for dissemination would enhance information flow within the IMT and enhance timeliness of delivery.

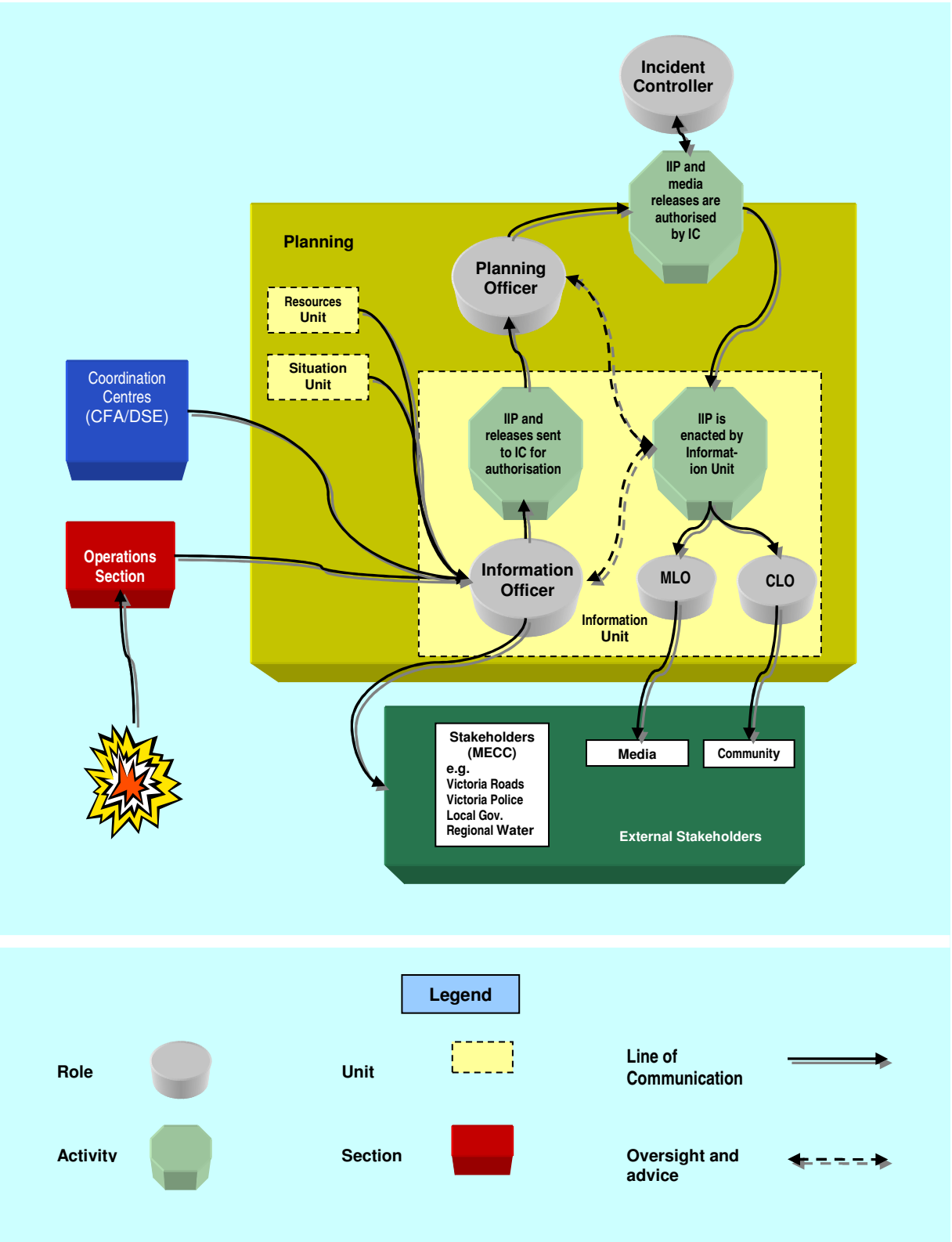

Figure 8: Information flow within the Information Unit and the rest of the IMT

6.1.2 Information flow between control, coordination & emergency partner organisations

Figure 9 illustrates the interconnections between the fire control functions (at local, regional and state level) and the MECC, as described by the interviewees. The IMT is included in the locality of the MECC and interfaces with it. The IFACC is also likely to be sending and receiving information from the MECC.

The MECC is identified as the coordination centre for locally based emergency management partner organisations involved in assisting the response agencies with resources in the response phase. The role of the MECC is also to facilitate communication about the support and services to be provided to the community, provide needed welfare support as well as provide oversight and responsibility for the recovery activities. The dotted lines around the community represent the permeability of this boundary. The information flow to the community from the IMT is discussed later in section 7.

According to the EMMV, the MECC is chaired by the Municipal Emergency Response Officer (MERO), who is a member of the Victorian Police, and supported by a Municipal Emergency Resource Coordinator (MERC) from the local municipal council. The MECC is where utilities, government agencies, local government and others are able to liaise and coordinate their individual and collective efforts. The interconnection between these partners and their own organisations is outlined in Figure 9.

It was difficult to place the NEO agencies (e.g., DPI) who have other roles and responsibilities, such as managing the response to livestock losses.

According to the interviews, when the MECC is not in operation all emergency management partners with an interest need to create a relationship with the Incident Controller given that the IMT has responsibility for the fire control functions. The MECC represents a critical tool for coordinating a variety of emergency management partners' interests. Figure 10 maps the flow of information from the fire control agencies, the MECC and other levels of coordination and support, as well as other partner organisations.

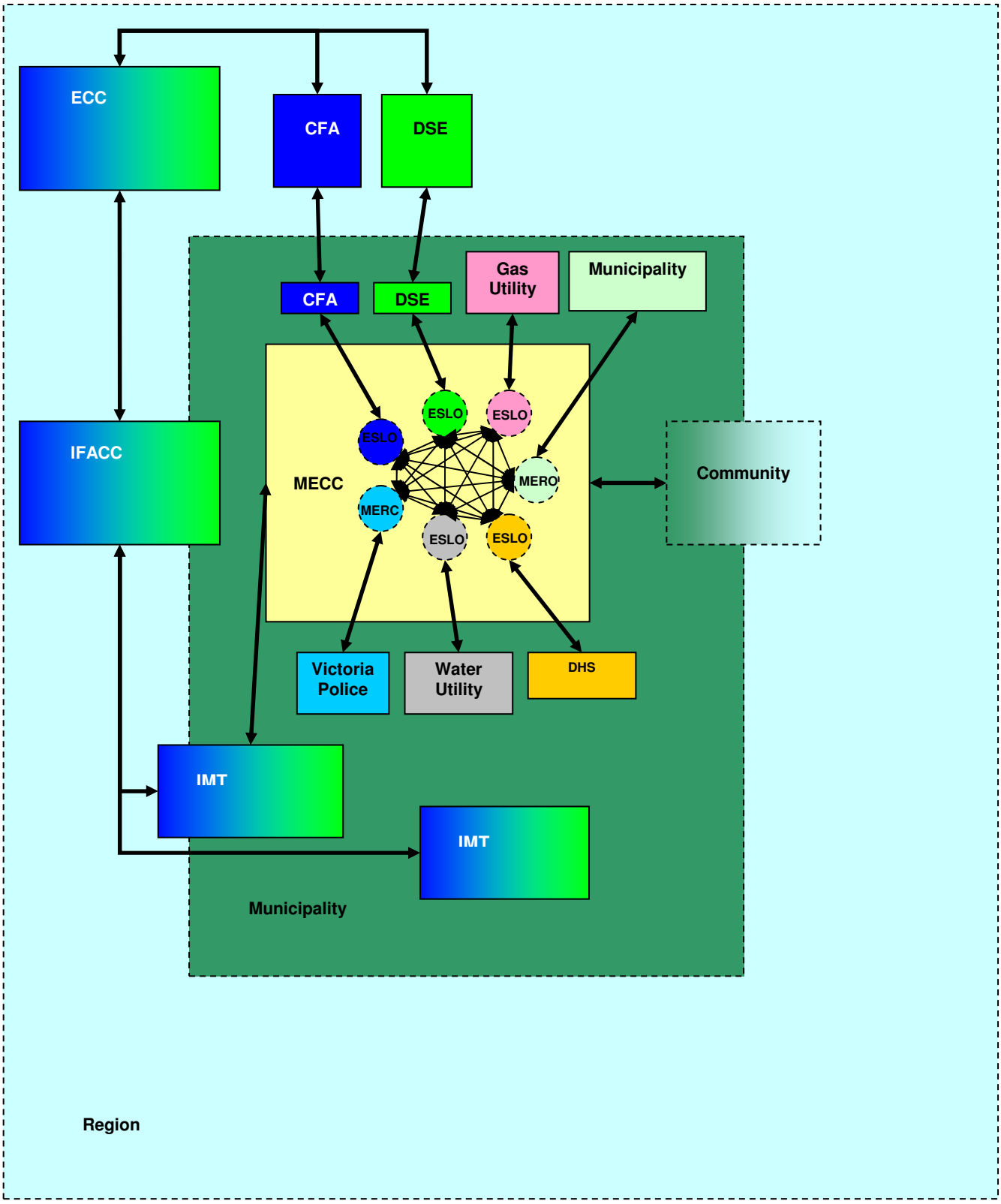

Figure 9: Information flow between the Incident Management System and the MECC

6.1.3 Information flow between control, coordination and emergency management partner organisations

The respective inter-connections between the various layers of fire control (and its internal command systems); emergency management coordination and support as designated in the EMMV, and the liaison needed with other emergency management partner organisations are mapped in this next section. Figure 10, following, shows the flow of information from the location of the incident vertically through the Fire Control agency and horizontally to the local level of the Emergency Management Coordination and Support arrangements.

The figure shows how some levels of coordination are not always activated, as represented by the dashed lines. Thus, if an incident is local and has not escalated and is straight forward, there may be communication between the local (ICC) and the state (ECC) level only. If resources beyond control agency capacity (i.e. employed, contracted or registered volunteer) are required, and if at a local level the event becomes more complex, the MECC is established. As discussed, gearing up this point of coordination for partners with emergency services roles and responsibilities is critical. The other points of coordination in the information flow represented with dashed lines (IFACC, DECC) indicate that those coordination structures are not always in place. In most circumstances, however, it is reasonable to expect that there will be coordination with other external partners and communication through a (MECC).

It is expected that there will always be some communication needed with NEO internal partner organisations as well as a need to manage the information flow upwards to the political sphere.

In this figure some of the arrows are two-way to illustrate how information can flow throughout the system. However, in the particular scenarios following, arrows will be used to indicate the direction of information flow based in the scenario being discussed.

A critical issue not represented is how the fire control function manages to service multiple MECCs when these are established, such as was the case in the Grampians fires of 2005. Issues for consideration include the relationships between the ICC and the IFACC on the one hand, and the MECC and the DECC on the other. At present this areas has not been articulated in any of the documentation reviewed and was not raised in the interviews. One possibility in the case of escalation of multiple fires and events may be to activate IFACC and DECC levels of coordination as soon as possible. It is also worth considering whether, at this level, centres of coordination may be co-located.

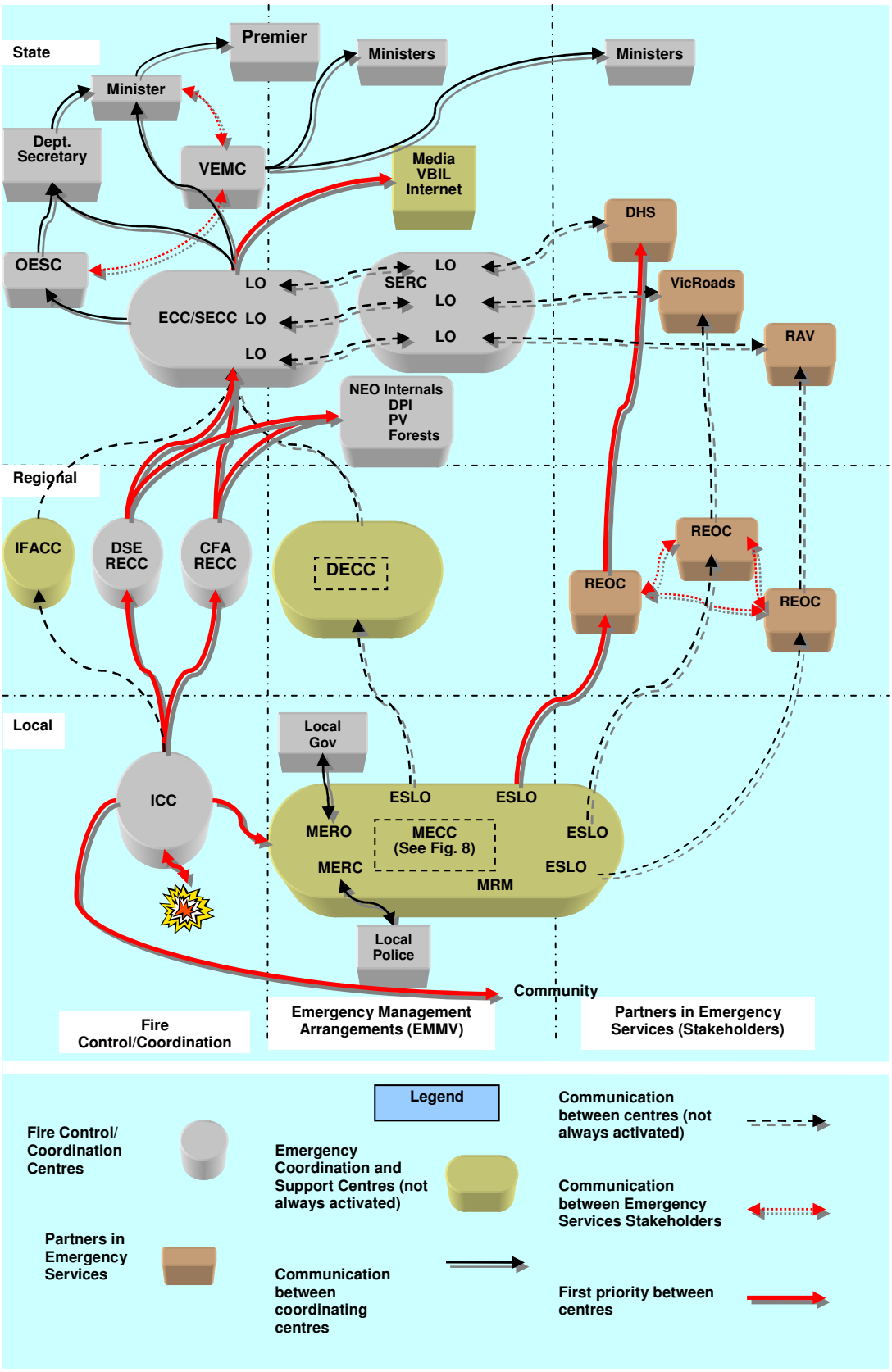

Figure 10: Information flow between Control, EMMV emergency management arrangements and emergency management partners.

6.2 Mapping information flow through the system

The types of information needing to flow from fire control agency functions to coordination and support and to other emergency management partner organisations will vary depending on the nature of the event that requires attention. In this next section this is illustrated through four possible scenarios in a fire-related event. The scenarios include the need to:

- activate a road closure (or traffic management point)
- manage the threat to power-lines
- relocate a human services facility (hospital/aged care)
- provide emergency relief

The first scenario is based on the *Guidelines for the Operation of Traffic Management Points During Wildfires*. There are no such guidelines for the other two scenarios. Consequently, the two maps for those scenarios are developed from interviews with, and feedback from, a number of experienced practitioners. The maps included here have been reviewed by key partner representatives for validation.

6.2.1 Information flow to activate a road closure

To distinguish between a full road closure and a partial road closure, according to the *Guidelines for the Operation of Traffic Management Points During Wildfires*,[*] the Victoria Police (VicPol), Country Fire Authority (CFA) and the Department of Sustainability and Environment (DSE) **all** have the authority to establish and operate a Traffic Management Point (TMP) with the caveat that, *Nothing in these Guidelines limits or derogates from the independent discretion that is available to police officers in the exercise of their duties and functions.* (General Principles 1.7).

> *A Victorian Coroner has made a ruling that Victoria Police have powers at a bushfire under s.31(3)(a) of the Country Fire Authority Act 1958 to stop people from travelling past a traffic management point regardless of whether they wish to travel to a place where they have a pecuniary interest or not. CFA and DSE also have this power.* (General Principles 1.6)

Some examples of *specified individuals or groups* that may be authorised by the Incident Controller to pass a partial road closure at a TMP *include (but are not limited to)* (General Principle 2.2.2):

- *Participating emergency service personnel travelling by car;*
- *utility providers;*
- *persons on private fire-fighting equipment;*
- *media personnel;*
- *people with a pecuniary interest.*

Fire control agency information flow

All of the *individuals or groups* named in the above examples (and others unnamed but suggested in the caveat '*but … not limited to*'), which have historically demonstrated a need to gain access beyond a road closure, would have information requirements concerning the location and status of a road closure to assist in the development of their own contingency plans. It would assist any agency requiring authorisation from the Incident Controller to be aware of that requirement prior to arrival at the road closure. Equally, any agency that would not gain authorisation to pass the road closure should be able to establish that before arriving at the road closure point.

[*] All text in italics is directly quoted from the *Guidelines for the Operation of Traffic Management Points During Wildfires*; a joint document produced by and for the Victoria Police, Country Fire Authority and the Department of Sustainability and Environment.

Figure 11, page 36, shows the information flow resulting from the establishment of two types of TMPs. TMP 1 is established by an Incident Controller (CFA or DSE) and TMP 2 is established by Victoria Police.

The figure shows that if an Incident Controller from either the CFA or DSE initiates a TMP (TMP 1) that the Incident Controller is then required to *pass **all** the information about TMPs required under these Guidelines as expeditiously as possible to* (General Principle 2.3)*:*

- *In the case of Victoria Police the Police Operations Centre, or in the event, a Police Operation Centre has not been established, Police Communications;*
- *in the case of CFA or DSE, to personnel in the Incident Management System who require the information.*

If Victoria Police initiates a TMP (TMP 2)*, the decision must be communicated to the Incident Controller as soon as possible* and the TMP *will be a Full Road Closure unless the TMP is varied by the Incident Controller* (General Principle 3.5). If the Incident Controller subsequently changes any of the conditions of a TMP *during the operational period of a TMP, the Incident Controller must immediately advise Police Operation Centre/Police Communications (as applicable) of all of the relevant details* (General Principle 4.2.1).

The Guidelines state that when information is passed from the Incident Controller to either the Police Operations Centre or Police Communications *(as applicable) Victoria Police must confirm the information so passed* (General Principle 4.3.1). And, *whenever the Police Operation Centre/Police Communications (as applicable), passes information from the Incident Controller to Victoria Police TMP staff, that TMP staff person must confirm the information so passed* (General Principle 4.3.2).

The Guidelines indicate that the Incident Controller has *responsibility for deciding and managing the location and status of a Partial Road Closure at a TMP* (General Principle 3.2), while *Victoria Police will operate all TMPs. Victoria Police may request the State Emergency Service to assist in the operation of road closures* (General Principle 3.3).

Information flow to emergency management partners

The Guidelines place the responsibility *for notifying either the Municipal Emergency Coordination Centre (MECC), **or in the absence of a MECC**, the VicRoads Traffic Management Centre, of road closures/openings, and that this communication will take place by telephone (*General Principle 6.1)

The red dashed line indicates the contingent flow of information in the circumstance that the first options are unavailable. If, for instance, the MECC has not been established, then the Incident Controller is required to forward the relevant information to the VicRoads Traffic Management Centre. In addition, if the Police Operations Centre has not been established, then both the Incident Controller and the responsible officer from Victoria Police are required to forward the relevant information directly to Police Communications. From reading the current Guidelines, it is not known how relevant information is conveyed to emergency management partners, particularly if a MECC is not in place.

Figure 12, page 37, shows the flow of information from the location of the incident vertically through the Fire control agency and horizontally to the local level of the Coordination and Support arrangements. Each of the agencies which are represented in the Municipal Emergency Coordination Centre then passes that information through to their own coordination points. The information flow between the ICC and the Police, as well as with the MECC is two-way, illustrating the close collaboration and cooperation required.

6.2.2 Information flow to manage the threat to power-lines

Figure 13, page 38, shows the flow of information as a consequence of the requirement for powerlines under threat due to an actual and/or potential bushfire threat during a level 2 or 3 incident when a MECC is in place. The figure shows the flow of information from the location of the incident vertically through the fire control agency and horizontally to the local level of the Coordination and Support arrangements. Each of the agencies which are represented in the Municipal Emergency Coordination Centre then passes that information up via their own coordination arrangements.

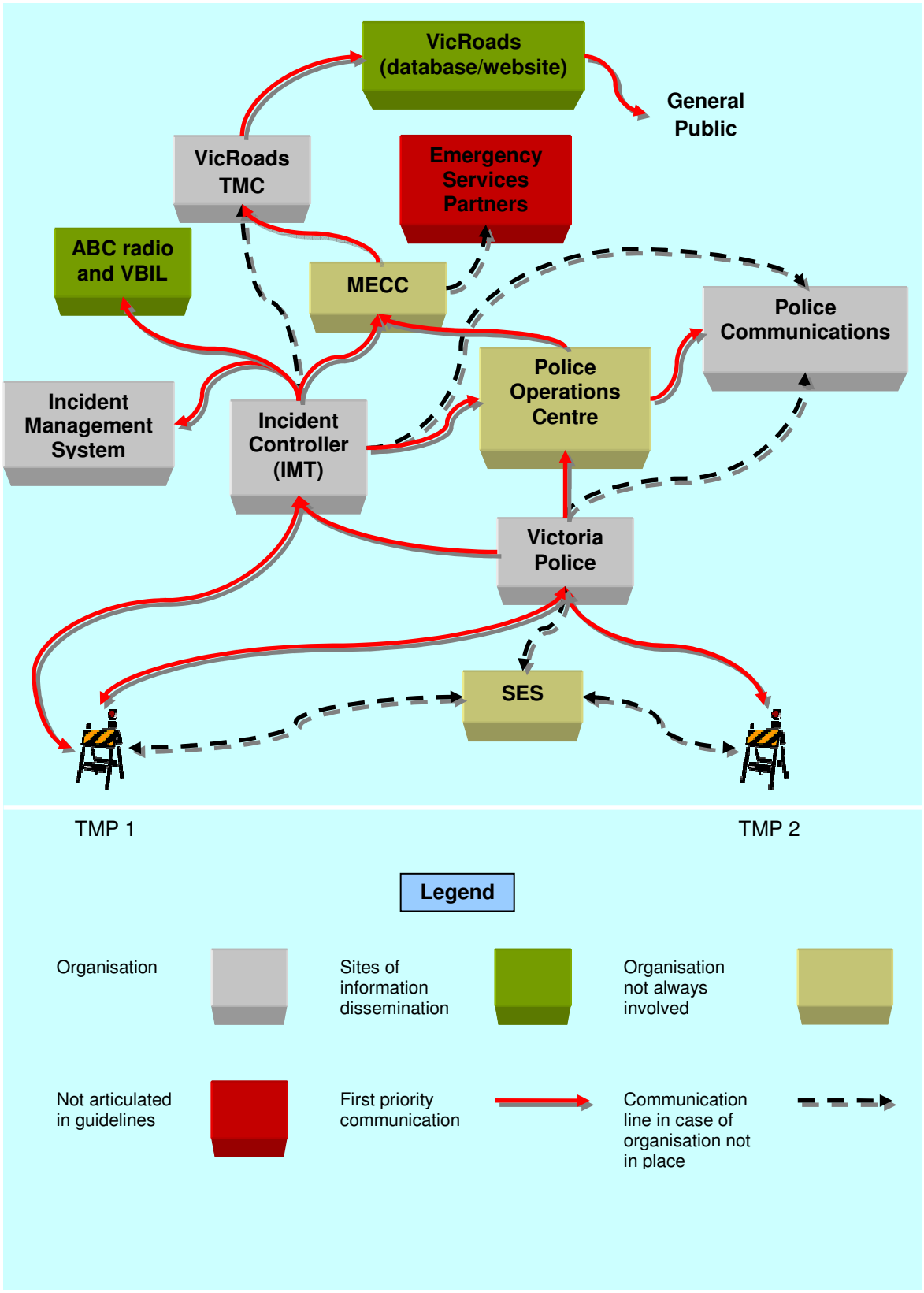

Figure 11: Information flow request to establish road closure (Source: Guidelines for the Operation of Traffic Management Points during Wildfires).

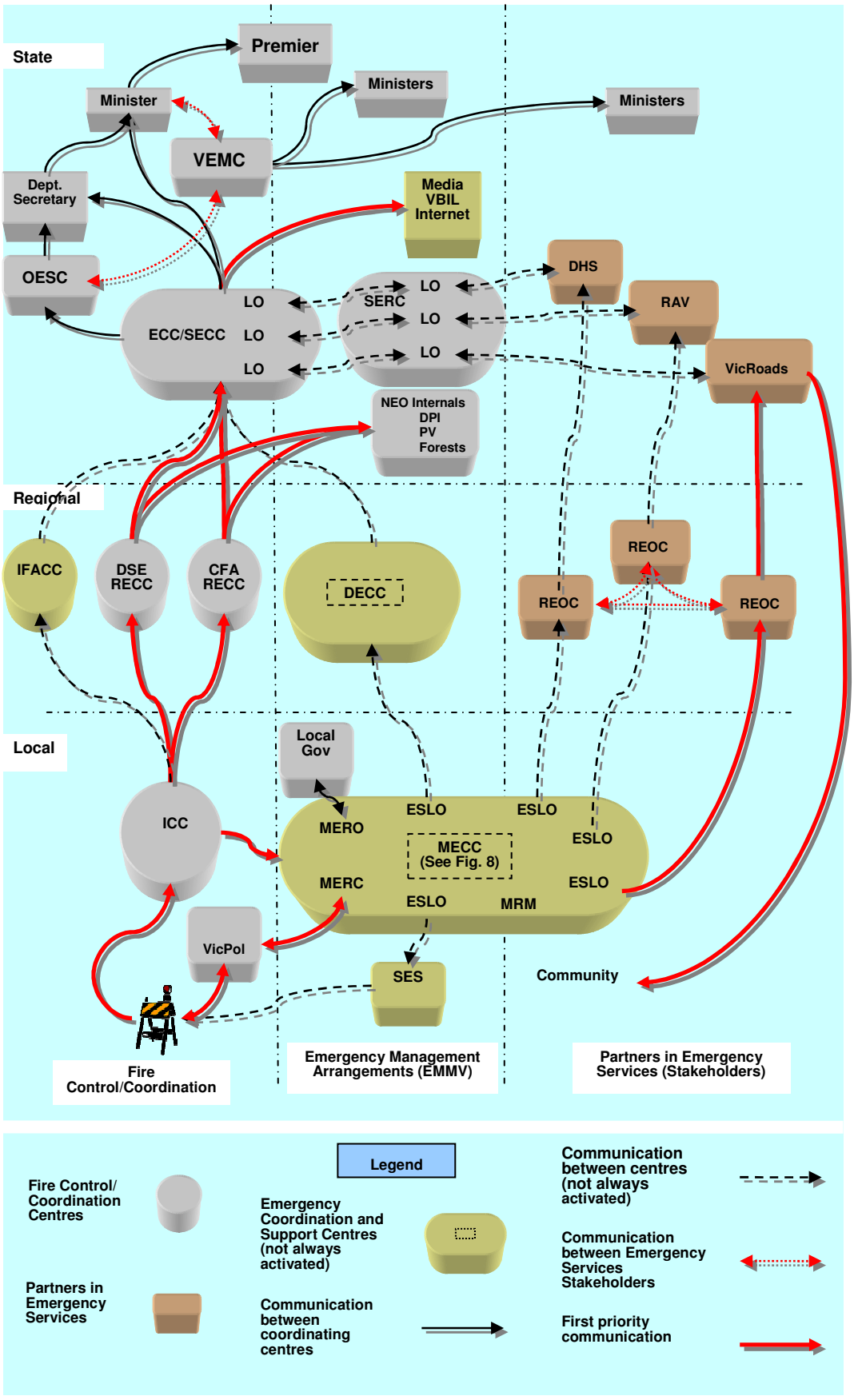

Figure 12: Information flow for road closure.

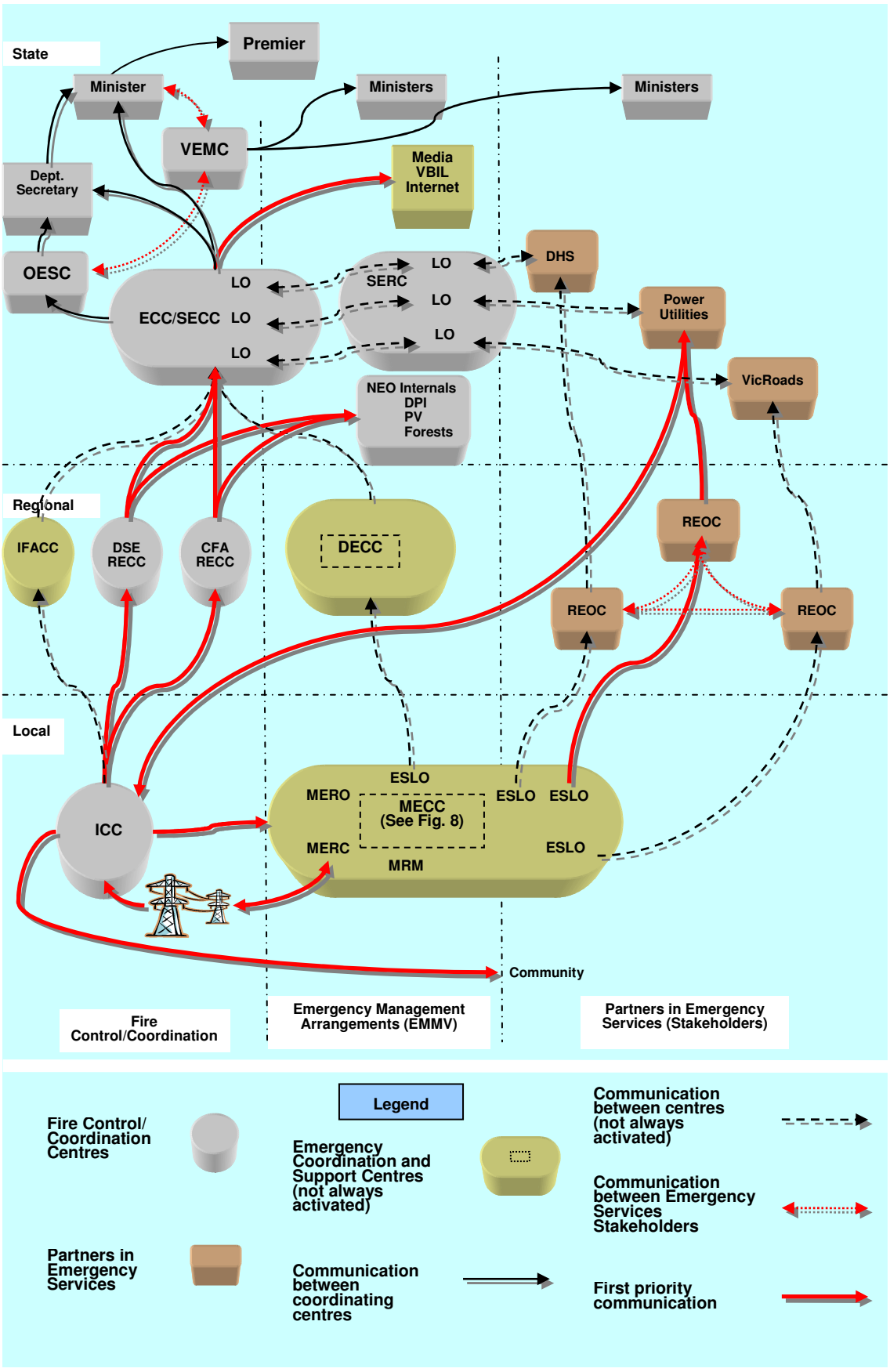

Figure 13: Information flow for a bushfire threat to power-lines.

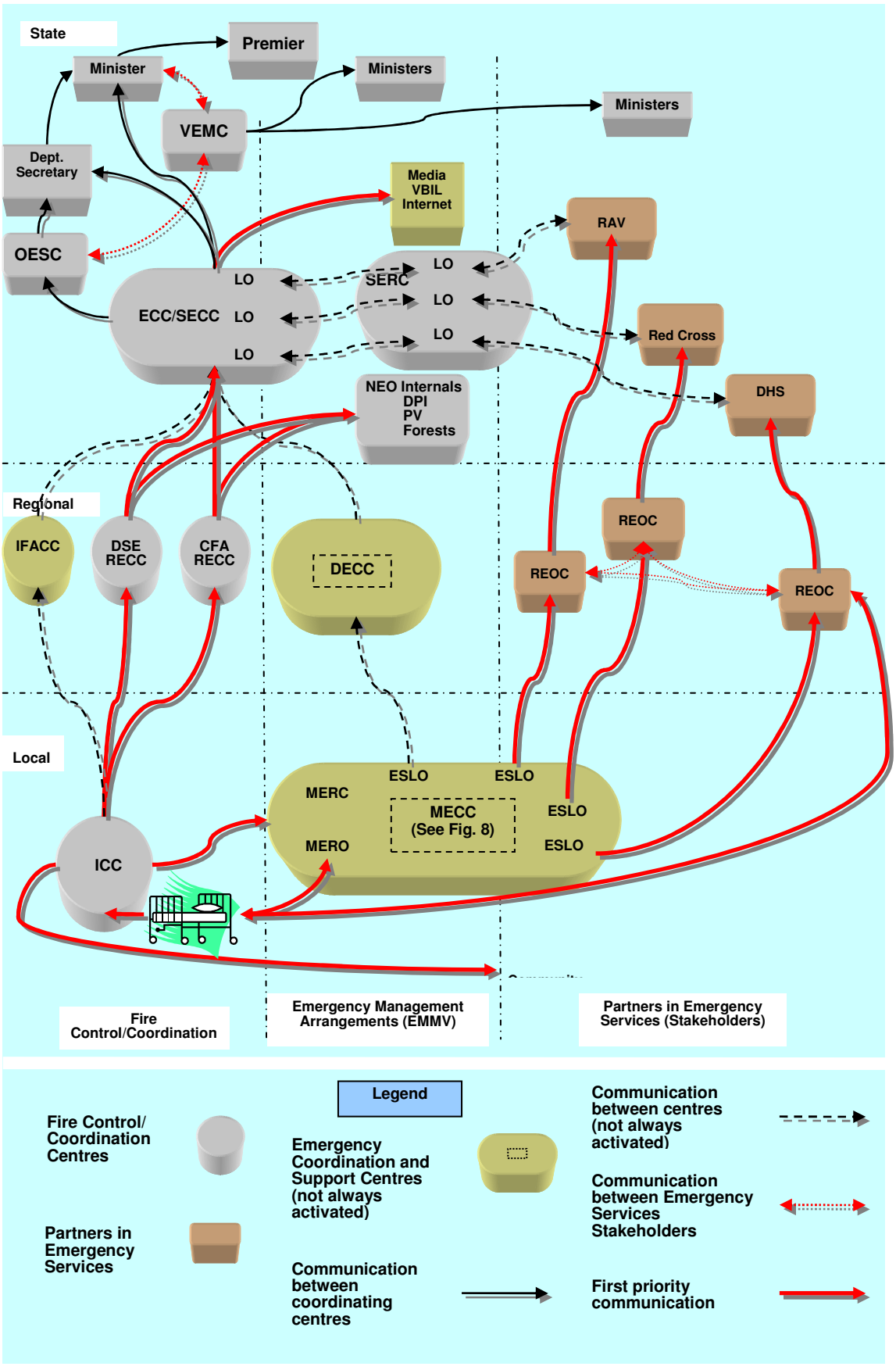

Figure 14: The flow of information for a human services facility relocation.

6.2.3 Information flow for facility relocation

Similar to Figure 13, Figure 14 (relating to human services facility relocation), on the previous page shows the flow of information from the location of the incident vertically through the fire control agency and horizontally to the local level of the Coordination and Support. Each of the agencies represented in the Municipal Emergency Coordination Centre then passes that information up through their own Emergency Coordination and Support/ Emergency Services Liaison coordination levels. The use of two-ended arrows indicates that information flows in both directions.

The DHS is the agency with responsibility for human services facility relocation. Information, which is provided to the DHS by the ICC, is provided to the MECC and can take two forms:

1. Specific information concerning the spread of the bushfire that the IMT has determined will have an impact on specific facilities.
2. Generic information concerning the spread of the bushfire that the DHS has determined will have an impact on specific facilities.

The MECC provides an opportunity for partner agencies to collaboratively make decisions and keep each other informed of their capabilities in assisting the DHS to relocate their facilities (for example, information concerning TMPs and power outages).

Having received the information, the DHS ESLO then disseminates that information to their agency REOC. The agencies involved then communicate their needs to each other at the regional level of coordination. The DHS REOC is the level of coordination with the responsibility of coordinating the relocation effort.

6.2.4 Information flow for the provision of emergency relief

There are a number of interrelated and overlapping issues which make problematic the mapping of the information flow relating to the need to assist people to access an emergency relief centre, in particular during fire impact. These issues include:

- The number of ways in which the need for emergency relief comes to the notice of the responsible authorities.
    - People arrive under their own volition at locations which have been predesignated in Municipal Fire Plans as emergency relief points.
    - Having not left earlier, people self-evacuate during fire impact to either an Incident Control Centre or a Traffic Management Point
    - The responsible authorities in the ICC, determine that some people may be required to relocate due to fire behaviour and forward that information to the MERO and/or MERC.
    - The municipal authorities determine from information provided by the ICC that people will be required to be relocated.
- The scale and nature of the MECC is dynamic, and contingent on a number of factors, and may take a variety of forms.
    - The MECC may at certain times, such as in a low threat or early phase of a bushfire, be a MERO and MERC, operating together in a ‘virtual’ MECC where other partners are contacted and coordinated off site by a variety of communication modalities (e.g. telephone, fax and email).
    - MECCs are located, resourced and staffed with personnel available to the municipal authorities and agencies in accordance with the principle of variable availability.
    - Span of control issues relating to the escalation and de-escalation of the MECC are not articulated in documentation.

- There are currently no predetermined criteria that the authors could locate for how the need will be met.
    - In some circumstances the municipal authorities will pass the requirement to other agencies in order to save their own financial and human resources.
    - Some municipal authorities have Memoranda Of Understanding with partner agencies while others do not.

The two following figures describe the information flow requirements in the case of two different scenarios.

Figure 15, page 42, shows the information flow in the event of people requiring food and shelter in an emergency relief centre in the circumstance where a MECC has been established and the municipal authorities have assumed primary responsibility for the provision of emergency relief for people in their municipality. This is undertaken in consultation with partners in emergency services organisations such as the DHS, Red Cross and Salvation Army. The Red Cross collect and collate personal information of the people relocated and then make that information available at the Red Cross State Inquiry Centre.

Figure 16, page 43, shows the flow of information when the MECC is established and the responsibility for the provision of emergency shelter is primarily assumed by agencies, such as the Red Cross, Salvation Army and St Vincent de Paul. The Red Cross collects and collates personal details of those affected and makes that information available from the Red Cross State Inquiry Centre. These agencies communicate with each other and coordinate their activities at the regional level via their Regional Emergency Operations Centres (REOC).

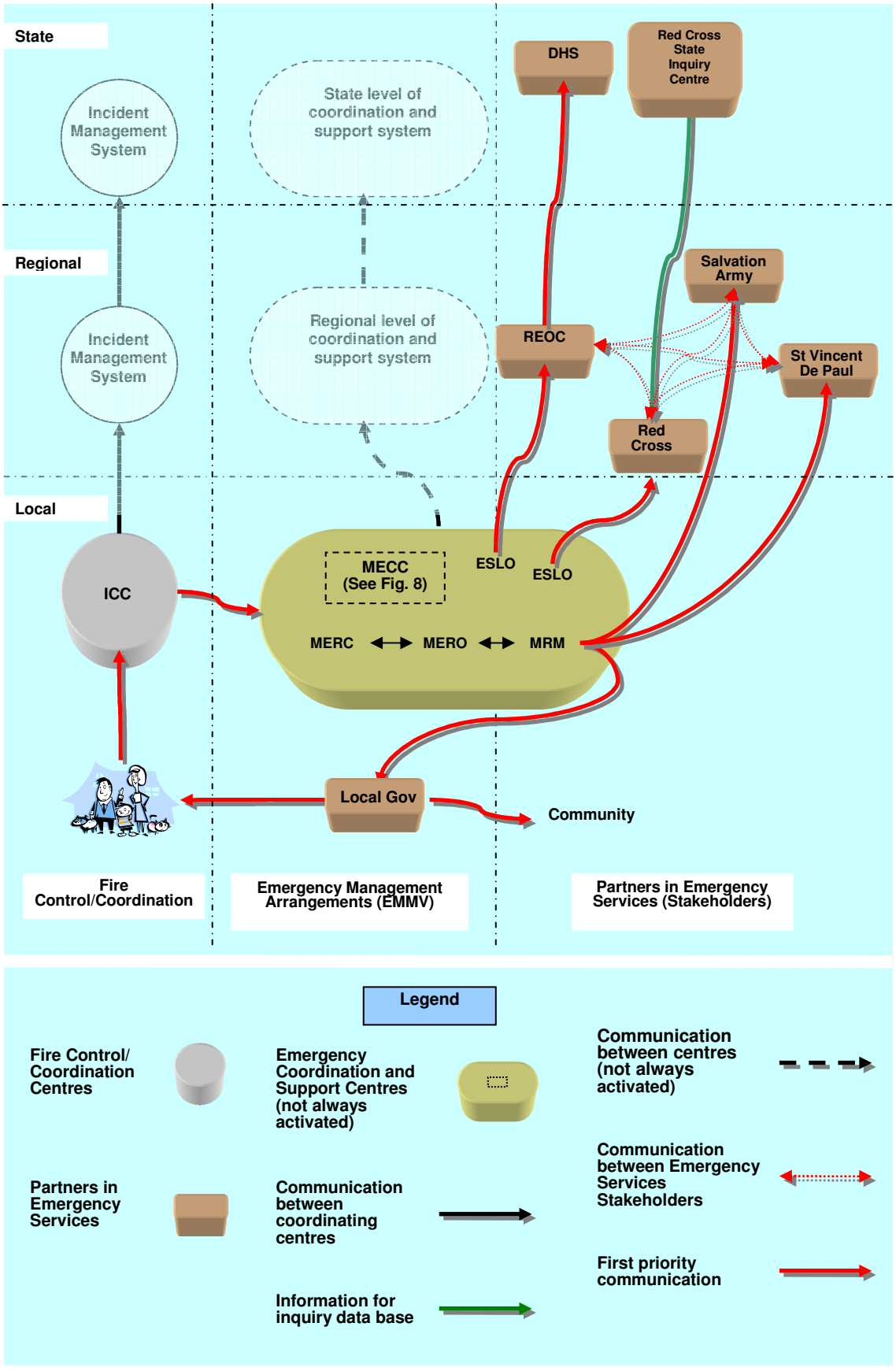

Figure 15: Information flow for self-evacuees' food and shelter needs via municipal authorities

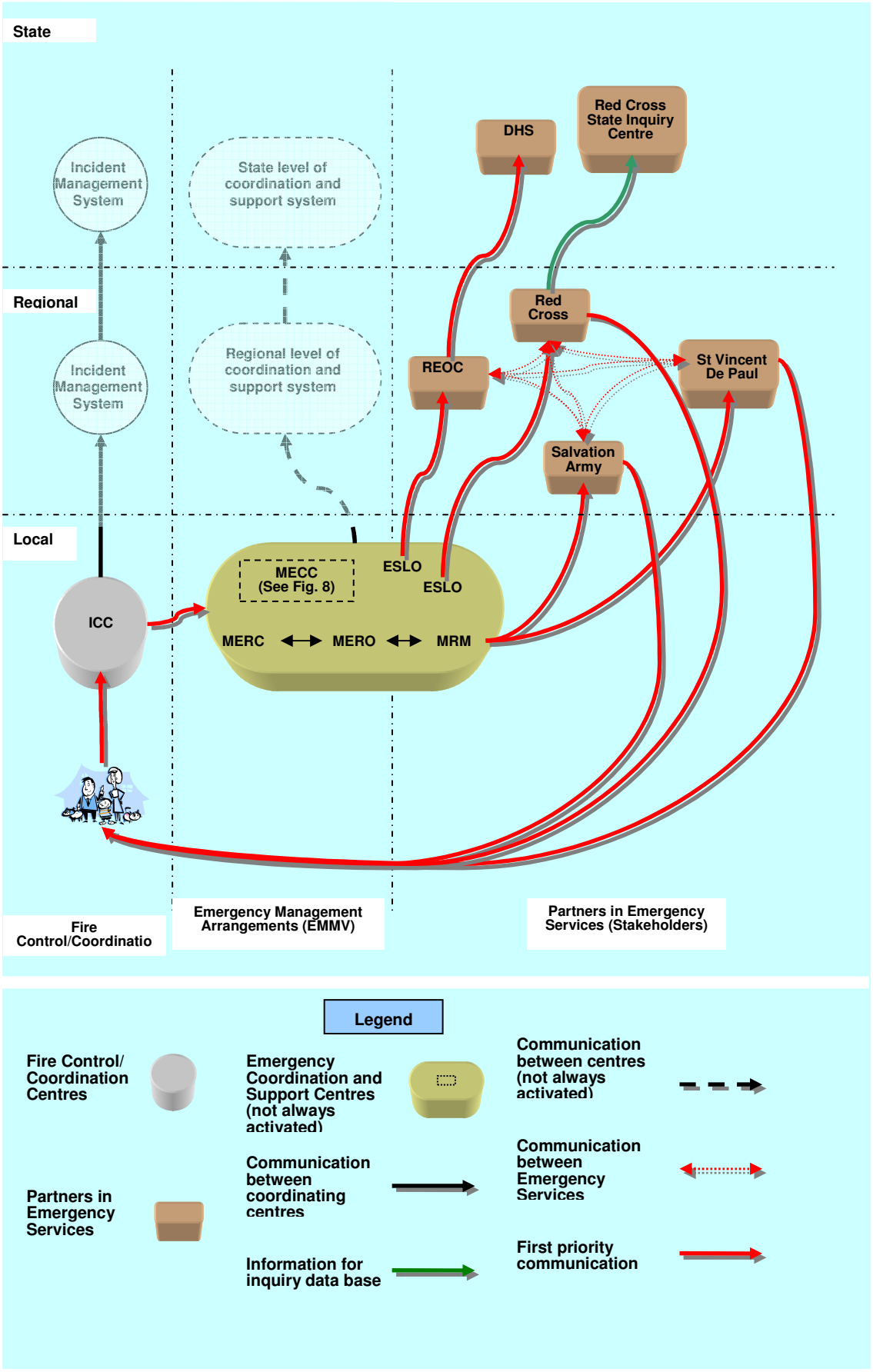

Figure 16: Information flow for self-evacuees' food and shelter needs via partners in emergency services.

7 Mapping different information flow to support communities

This section illustrates the ways in which information flows to the community from the fire control agencies. As was discussed in Table 3, there are different layers of geographic communities that will have different information needs. It is also recognised that these communities comprise a diverse range of interests, identities and dispositions. These can include ethnic, aged, homebound, Indigenous, and deaf communities, to name but a few. It is outside the scope of this report to address differing communities and their information needs, and so the focus here will remain simply at the location of a community in relation to the impact of the fire.

There needs to be collaboration between emergency management partner organisations (such as the DHS and municipalities) in relation to how particular types of communities in various locations might best be targeted if the MECC is not activated. It may also be worthy of suggesting that, in a response phase, fire control agencies might delegate responsibility for targeting particular community types differing communities within the geographic area to the MECC. The rationale for this is that such coordinating mechanisms have a range of local expertise available (e.g. municipal community workers and local representatives from DHS).

Table 8: Elements of community and their information needs.

COMMUNITY LAYER	INFORMATION NEEDS
LOCAL **Direct imminent or likely impact (future)**	Information about the level of threat Warning of fast moving fire Local owner response plans & preparation Information to assist with decision to stay or go Community safe locations
LOCAL **Direct fire impacted (past)**	Information about the availability of resources including government assistance, infrastructure
REGIONAL **Indirect Impact (tourism, family relationships)**	Road blocks/road closure Likely direction of the fire front Information to assist with decision to stay or go
STATE **General public of Victoria**	Location of fire Likely direction of fire front Level of threat to the regions impacted Road blocks/road closure Key infrastructure at risk

Table 8 summarises the geographic communities and their information needs relevant to a fire-related emergency event. The table illustrates the kind of information strategies that the Information Officer in the Incident Information Plan will address, using the variety of dissemination tools discussed in detail in the Information Unit Guidelines. Of interest here are the differing modalities that might be employed and the levels of authorisation needed to do

so. Figure 17 below illustrates the different community audiences and the communication modalities typically in use at different geographic levels.

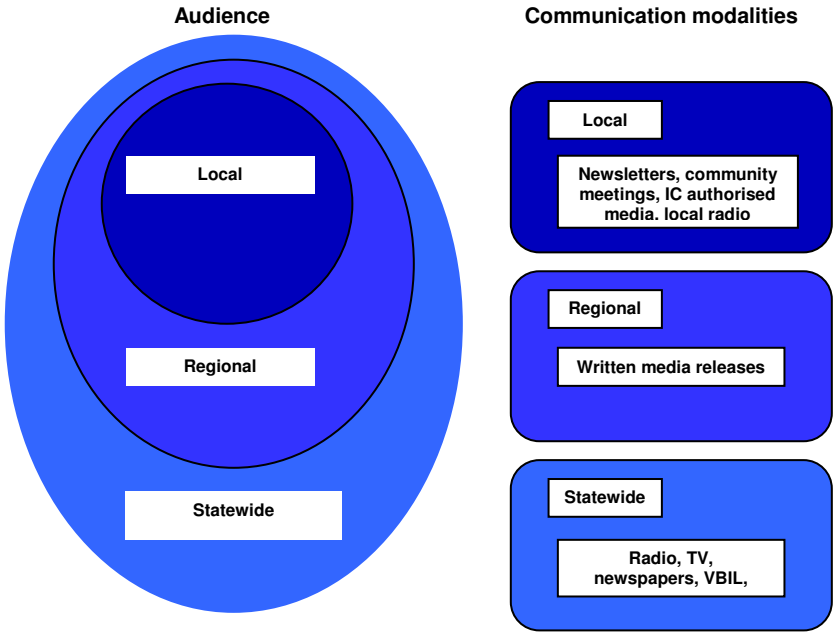

Figure 17: Levels of community and communication modalities.

In the case of communities directly experiencing the threat or impact of fire, as the Information Unit Guidelines propose, face-to-face and multiple methods of information delivery are going to be more appropriate. During 2007 considerable development occurred in creating templates through the joint DSE/CFA Information Unit Project to support these varied communication modalities.

There is also a tacit assumption (i.e., the authors of this report have not yet found roles and responsibilities explicitly discussed) that different communication modalities are managed by different levels of organisation within the incident management system. It makes sense to delineate different communication functions to different levels of organisation, provided this streamlines information flow processes and does not create additional bottlenecks.

It is suggested that the roles and responsibilities at different Information Unit levels (at IMT, IFACC and ECC) need to be better differentiated to avoid duplication and to streamline service delivery and non-operational intelligence gathering. The level of organisation that appears most under-developed and in greatest need of integration is at the regional level, or at the IFACC when one is activated.

The level of organisation that appears most under-developed and in greatest need of integration is at the regional (IFACC) level, when one is activated. It is currently problematic, under certain conditions, that information needs to pass through the IFACC or even through the ECC before certain types of information can be publicly displayed. The discussion earlier about pre-approved release of certain types of information under certain conditions is worthy of consideration.

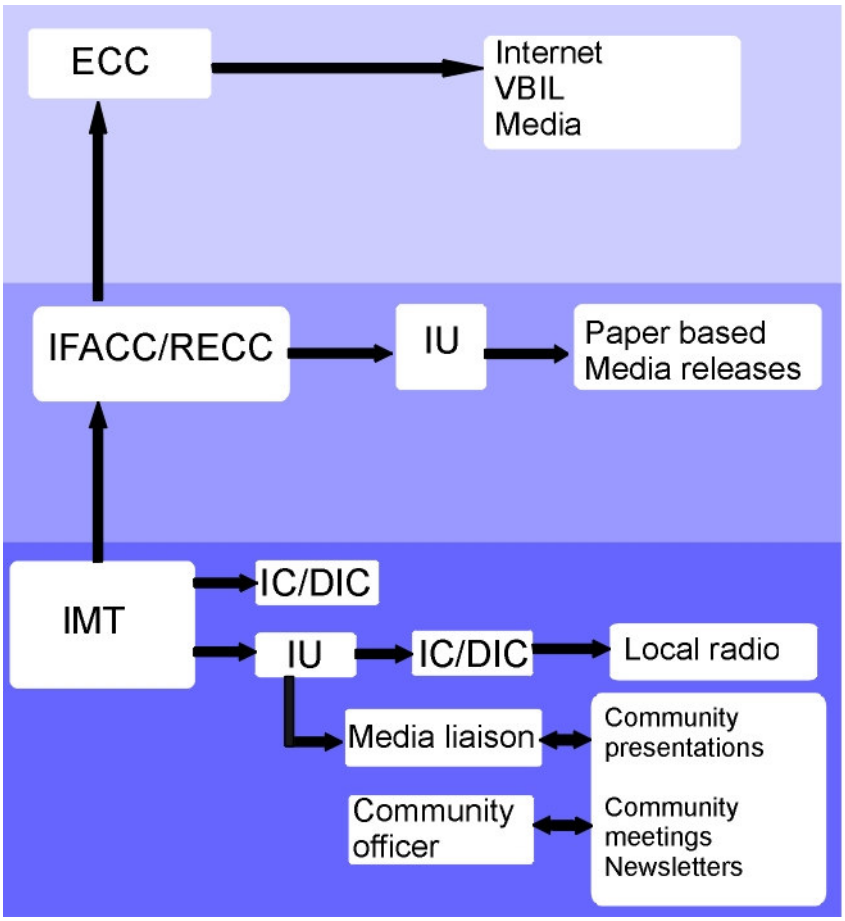

Figure 18: Differing communication modalities managed at local, regional and state Information Unit levels.

In campaign fires, the local, regional and state levels operating within fire control agencies are well established and changes can be reasonably anticipated and thus managed. The challenge is when these conditions are not established, either because integration between local, regional and state levels are not functioning effectively or because there has not been time to set them up properly.

7.1 Risks to timely information flow to support communities

Table 9 below summarises the potential risks in information blockages that can occur at the various levels within the Information Unit functions in the fire control structure.

Table 9: Community communication strategies at local, regional and state levels, and areas of risk of information blockage.

LEVEL	Level in fire control agency	Communication modalities	Potential risks to timely information flow/blockages
STATE	ECC	VBIL; Internet; state-wide media – radio, TV, newspapers	- Information about threats/loss incomplete - Information delays in transmittal to outlets (VBIL; Internet) - Not all maps are appropriate for dial up connection
REGION	District Office or IFACC if activated	Written media releases	- Changes to information does not reflect local situation; - Delays in information being fed up to ECC
LOCAL	IMT: IC and IU	Newsletters; community meetings; IC authorised radio broadcasts	- IC becomes overloaded; - ICC not committed to information management - Connections between situation and information units weak - Information unit not adequately resourced - Information not conveyed appropriately at meetings; - Community meeting attendance is not comprehensive - Disconnect MECC/DERC delays in SEWS
LOCAL FIRE-GROUND	Divisions/ Sectors	Phone Radio	- Fire-ground does not inform IMT of its situation/strategy; - Informal contact with community results in contradictory messages - Media contact not coordinated through appropriate channels

The table outlines possible risks to timely information flow in providing information to support communities. It should be noted that, as one respondent said, even if the system is operating as effectively as it possibly can be, if information has to filter through a variety of levels, and each time it is being authorised/processed before it can be disseminated, the time frame will still be far too long. For example, if information coming in from the fire-ground is processed within 15 minutes (arguably an unrealistic ambition) before being progressed through each level, it would still take one hour[2] before the update appeared on state level information dissemination points. It should also be noted that, in part, this reflects the heavy reliance on transfer of information through paper-based means.

[2] Fire-ground to IMT; IMT-IFACC; IFACC to ECC; ECC to point of distribution (VBIL; Internet)

Under certain circumstances (e.g. a fast-moving fire with high potential to threaten a community) a different flow of information to the community may be warranted. Figure 19 illustrates how, if a going fire escalates rapidly and moves to imminent impact, then the Information Unit should have all information methods at its disposal.

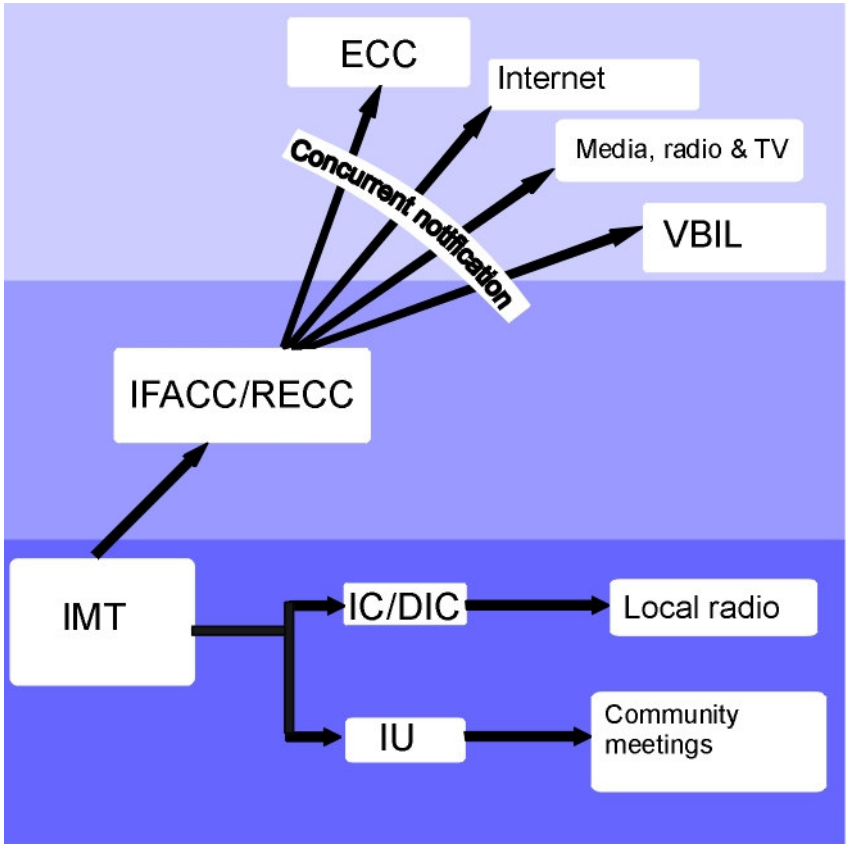

Figure 19: Possible information flows to communities under conditions of running fire.

An ICC Information Unit is likely to be busy:

- preparing notification messages for intended audiences, including notifications for the VBIL; Internet; as well as local dissemination strategies;
- preparing radio broadcast opportunities for the Incident Controller/Deputy Incident Controller;
- facilitating connections to the DERC to issue SEWS;
- arranging community meetings (in conjunction with the MERO/MECC);
- managing media interest.

Therefore, in facilitating information flow to partner organisations, it would be useful to identify where some of the load can be transferred up to the IFACC (if available) so that it can be concurrently disseminated to multiple locations at once, rather than needing to flow sequentially, through the various layers.

7.1.1 Authorisation of information dissemination to communities

Attempts to address the issues of authorisation and timeliness have been included in the updated Information Unit Guidelines. However, in the endeavour to streamline information flow to address these bottlenecks others may have been established.

For example, the Guidelines make a distinction between 'decisional' and 'enabling' activities. The 'decisional' activities are to be conducted, appropriately we believe, at the local/IMT level. The intention of migrating decision-making down to the lowest possible level is a very important principle and worthy of full support. However, in doing so it seems that another layer of bureaucratic reporting has in fact been added that may hinder timeliness of information flow to communities. This is because it seems that any action taken at the regional level needs to be first checked off and approved at the 'decisional' local level [cf: *The overseeing Information Officer located at the enabling location, as the workload increases, will have to liaise with the Information Officers or Information Unit Leaders at each IMT about the escalation requirements of the Unit*, p. 21]. This may present some extra decisional layers in the system that work against the timely delivery of information flow.

It would be helpful to distinguish where information is sent for information only and where in the system information flows need to be authorised.

Attachment 15 provides tables of the type of information required at the various stages of a fire-related event, including pre-response; going fire with potential for impact; fire impact on a community; post-impact; recovery, based on the information provided by respondents in the interviews. The tables provide a synopsis of the issues and risks associated with failure of selected aspects of information flow to support communities.

Suggested improvements are discussed in the conclusion.

8 Conclusion and areas for improvement

This report has reviewed:

- what can be learned from inquiries into large-scale multi-agency coordination found in the international literature;
- existing documentation to identify the roles and responsibilities for provision of information to emergency management partner organisations;
- data gathered from consultations with partner organisations about their information needs and their satisfaction with the information they receive;
- information required within and between partner agencies in a fire-related event, and mapped the information flows needed.

This section discusses what strategies might help facilitate improvements in information flow to continue to develop robust and resilient partnerships needed in a fire-related event. It is hoped that the following provide a platform to support the DSE's ongoing agenda to create a situational real-time communication system able to serve the variety of information needs.

8.1 Lessons learned from international incidents

A number of suggestions arise from the lessons learned from the literature:

Be cautious about lessons learned. An important insight from the review of inquiries into major international events was the caution not to take lessons learned too literally. As a consequence, of attempting to transfer learning too directly from what could be learned from the World Trade Center attacks, where many people were killed with few survivors, emergency services in London were unprepared for the scale of injured and traumatised victims in the case of the London Underground bombings.

Deploy emerging information technologies where appropriate.
Developing different kinds of information support systems that may enable disparate agencies – geographically dispersed – to build up and maintain situation awareness was identified as an important future agenda. The applicability here for the DSE is to explore the variety of information communications technologies and to trial their application in a range of information need situations. For example pod-casting the ECC briefings would enable emergency management partners to get updates when convenient for the partner. This would also allow a larger group to hear directly what is going on rather than having the message relayed.

Develop shared databases. Another feature mentioned for attention in the literature involved the development of mutual databases that might be shared on a secure extranet facility. This could be accessed by partner organisations. In terms of the DSE and emergency partner organisation information needs, more work would be needed to ensure the data was in a format that was meaningful to the context of the interested parties.

Proactively monitor inaccurate media reporting. An important strategy identified in the literature involved being proactive in monitoring, and thus correcting, inaccurate media releases. From the research reported here, this is particularly critical in fast-moving situations. This type of function could best be served at a state level. At present an overview of the media themes is collected on a daily basis. The proposal here would be one of changing the emphasis and strategy of this activity. The template used to distribute media releases needs,

if not already undertaken clear time-stamping of media releases which would help minimise confusion.

Integrate agency response plans. There was attention in the international inquiries on the need for integration of response plans. The DSE and the CFA have already made considerable progress in this regard. These advances are also needed with the other emergency management partners identified in this report to facilitate coordination in real-time. The progress underway in better coordinating planning with emergency management partners such as the municipalities and the DHS holds promise if they continue successfully.

Engage liaison personnel in training. The US inquiries in particular noted the importance of enhancing inter-operability through better training and resources for communications, information and liaison personnel. This needs to occur in both directions. That is, partner personnel would benefit from being involved in DSE/CFA IMT training. There was also comment made in the interviews with emergency management partners that DSE staff would benefit if they took up the invitations to MECC training. In planning training for the next fire season, it might be possible to organise joint training and exercising opportunities.

Facilitate leadership development and training. One of the critical breakdowns that occurred in both the case of the management of Hurricane Katrina and the SARS outbreak was the wilful subversion of system structures, leading to blockages in information flow. It is vitally important that ICs, indeed all emergency management personnel, have an understanding of the importance of information flow and information management and of the variety of stakeholder needs and uses of that information. This is a shift to systems thinking and to understanding where the activity is occurring within the broader context of emergency management arrangements and information needs.

8.2 Roles and responsibilities

Reinforce and legitimise the Information Unit. There is a need to continue to reinforce the role of the Information Unit in pre-fire season briefings to fire control personnel. This would assist in ensuring consistency in expectations and activities. The types of activities expected by an Information Unit could be supported by including the role and responsibility of the Information Unit in the DSE Code of Practice and reinforcing the role in the Fire Suppression Manual. This will assist in standardising the role and function

Include roles and relationships in EMMV. It would also be important for any update of the EMMV to reflect the adopted ways of organising fire control agencies in order to clarify emergency management arrangements, particularly in terms of information flow to support communities. This would provide a platform for better integration at the community and emergency management partners level

Facilitate closer linkages between the Information Unit and the MECC. As discussed, there is a need to develop more explicit linkage between the Information Unit functions and the roles and responsibilities of the MECC, which serves as the prime point of coordination for emergency management partner organisations. The practice of having an agency liaison officer in the MECC provides a conduit on strategy and incident priority tasks and key risks. However, use of the practice has been variable. Strengthening the linkage would strengthen the point of coordination.

Consider how information flows in the case of multiple MECCs. The history of experience with the Grampians fires illustrates the difficulties of one ICC attempting to service multiple MECCs.

Review reporting lines of the Information Unit. As discussed, the role and responsibility of the Information Unit continues to grow. There has been discussion about whether the Information Unit should be reporting directly to the Incident Controller. Extracting the Information Unit up and out of the Planning Section, so that it is directly accountable to the Incident Controller, and thus operates as a section in its own right, is worthy of consideration. However, the research reported here would suggest this strategy has serious risks associated with it in terms of setting up the possibility of parallel information pathways. Strengthening lines of communication within the IMT may provide a better improvement in information flow.

Review information flow within the planning section. This is particularly important in order to strengthen the relationships between the information gathered and interpreted within the situation unit and the information unit.

Review information flow authorisation in periods of escalation. To ensure timely release of information, it may be possible for certain types of information under certain conditions to develop a protocol where the release of information is pre-approved, provided there is no substantial addition of new content. Thus authorisation may be required only by the IC, the information may be released (to the community/emergency management partner organisations) and distributed to other levels of the control agency for information only.

Review DIC role as one of IMT integration. Historically, the role of Deputy Incident Controller (DIC) in Victoria has typically been taken by a member of the other combat agency, as a means of providing integration between agencies (i.e., in a DSE-led fire, the CFA would be the DIC). In some jurisdictions in Australia the role has been developed into an internal team-boundary spanning role, where the DIC acts on behalf of the IC to facilitate integration between IMT sections. If the DIC were to take on this supra-ordinate information management role, under certain circumstances (e.g., complex incidents) this could include the role of being the interface between partner organisations.

Consider developing a partner organisation role in the information unit. As noted, there has been considerable work in articulating and developing roles for personnel in the information unit to take responsibility for information flow to the general public. The same level of attention is needed in a role for facilitating information flow to partner agencies.

Review appointment protocols for the Information Officer. The Information Unit guidelines suggest that the Information Unit may scale up well ahead of an IMT, with an Information Officer being appointed before other members of an IMT. This strategy is not well known and process employed to do this and the conditions of such appointment need to be clarified.

Review activation of IFACC and roles. How an IFACC is activated is not clear in the documentation reviewed and it would be useful if this were clarified and then relevant components used in supporting documentation, such as the Information Unit Guidelines. In terms of clarifying information dissemination roles, it might be valuable to leave information dissemination to support communities at the IMT level and develop the role of the IFACC as the point of contact with the MECC/DECC.

Clarify the conditions for activating a DECC. Having knowledge within fire control agencies, particularly for personnel involved in local or regional levels, of the roles and purposes of the DECC and when such a coordinating mechanism comes into play would help with understanding the broader emergency management arrangements. One issue repeatedly raised in the interviews was the problem of how a DECC operates when the boundaries (of fire agencies, government regions and police divisions) do not align.

Conduct further investigate as to why information flow between the fire-ground and the IMT continues to be problematic. The issue of getting timely information from the fire-ground continues to be problematic. The research reported here did not access any personnel who would be able to shed light on the blockages at this level. The DSE is working on this area in a separate project. Addressing this area of potential disconnect will bring considerable benefits.

Consider the role of the information unit in providing non-operational information to fire-ground personnel. This role for the Information Unit is outlined in the Information Unit guidelines as well as in the AIIMS documentation. However, there seems to have been no attention given to it to date. Information Unit personnel did report that they received complaints from fire-ground personnel about not having an overall picture of what was happening.

8.3 Partner organisation information needs

Develop partner information templates. The type of information required by partner organisations has commenced development in this report. Templates could be developed to service particular types of information needs by emergency management partners, in the same way to that undertaken to support communities.

Develop IIP for information flow to external partners and to represent information needs more dynamically. Alternatively, the Information Plan developed could contain information types relevant to emergency management partner organisations and circulated to them. The IIP could also be more dynamic in that it could represent different priorities depending on the phase of the fire event.

Review advice about MECC activation protocols. The documentation regarding how an Incident Controller requests activation of a MECC are not widely known. Explanation of this, particularly the subsequent role of the Information Officer in managing the interface would be helpful.

Clarify protocols in periods of escalation. The information flow responsibilities in periods of escalation appear to be under-developed, particularly the integration between the various layers in fire-control agency coordination and support and their interface responsibility with the Emergency Management Coordination and support functions.

Review levels of authorisation for information dissemination. At present there is the need for multiple authorisation of information dissemination tools. For example, when information is going to the VBIL or onto the internet, it needs to travel from the fire-ground and through each of the layers of the fire control agency. Certain types of information may be identified in terms of their level of approval required, with authorisation pushed down to the lowest possible level.

Clarify authority in IMT/IFACC information unit relationships. The current Information Unit guidelines refer to enabling activities occurring in the IFACC and decisional activities occurring in the IMT. However, these seems to be an added layer of bureaucracy that may inhibit timeliness.

8.4 Facilitating information flows

Clarify information flows in the absence of a MECC. There seemed to be some confusion among emergency services liaison officers about whether a MECC is always in existence and what happens if one is not yet in place.

Further develop understanding of partner needs. There is a need to continue to build up understanding of the information needs of emergency management partner organisations and the issues they confront. This could occur through a more comprehensive and more widely distributed survey that could then be used as a mechanism for facilitating dialogue and further improvements.

Develop system safety health indicators with emergency management partner organisations. This data could feed into a set of agreed indicators of what to look for to know how coordinated information is flowing. Such indicators could then provide objective evidence about levels of improvements in the system.

Develop more information mapping scenarios. Identify more scenarios where information flow is needed and map those to identify linkages needed and relevant areas of prioritisation. These could provide the basis for the development of guidelines similar to that developed around traffic management points. These could also be used as a means of reaching agreement with particular emergency management partner organisations on modalities used, templates needed and areas for prioritisation.

Ratify information mapping scenarios. The scenarios here have been developed through consultations with individual representatives of the partner agencies, and thus they may not necessarily represent formal policy. These need to be ratified and can form the basis of further articulation of guidelines, similar to those developed in the case of managing information flow needed for traffic management points.

Consult in relation to the findings of this report. The particularities of information contained in this report are likely to be conditional and in need of adjustment. It is suggested that the report be made available to emergency management partner organisations for comment and feedback for modification.

This report has mapped the flow of information during fire-related emergency events and identified key areas for improvement in information flows. Given the complexity of emergency incident management, it is not surprising that the arrangements involved are both complex and multifaceted. There are many different communities of interest with overlapping, though unique, information needs.

As this report has shown, the DSE are but one partner in a complex web of emergency management arrangements. Many issues raised here are generic and represent state-level issues. Some are quite specific. In attempting to come to grips with this complexity, it is hoped that the contents of this report provide opportunities to further develop the platform needed for the achievement of integrated and coordinated communication within a resilient emergency management framework.

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